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SCIENCE FICTION



False Prophet BY ROBERT RANDALL

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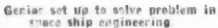
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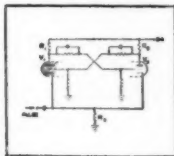
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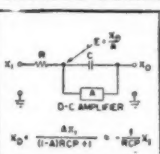
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SYMBOL: Short circuit? Quarter-wave stubs are insulating conductors.

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MATHEMATICS OF PSYCHOLOGY

Psychologists, as well as all other humanic scientists—sociologists, anthropologists, historians, et cetera—have long maintained that one of their major handicaps in developing a true science is the lack of an adequate mathematical technique.

I have, for some time, felt that their complaint was in large degree unjustified. I take it back; they are quite correct. But they are, none the less, responsible for the lack of an adequately rigorous analytical technique in their own field. I believe that I can express what the essential problem is—and working out a statement of the nature of their problem was, properly, their job.

They failed themselves, and, thereby, the human race they seek to serve; this is an objective fact, not a matter of opinion. They have not stated the problem in terms mathematical theoreticians could understand sufficiently to attack. When you need someone else's help, it's up to you, not up to him,

to explain what your problem is. The psychologists and humanic scientists have not done so.

Why isn't mathematics a useful technique for analysis of humanic problems? *What* order of problem must be solved? Define the problem, and then a method of solution may be developed to handle it.

One of the fundamentals of logic is that a negative statement implies all-statements-minus-one—infinity-minus-one. That is, "A is not X," implies only that X is anything in totality *except* A. This type of guessing game requires exhaustion of an infinity of infinities to determine a unique solution for X; it can't be done.

When the psychologists correctly stated "Mathematics is not suitable to psychological problems," they handed the mathematical fraternity a transfinite problem impossible of solution. The statement is true, but its meaning value approaches zero. Necromancy is also not suitable to psychological problems. (This state-

ment, like the "mathematics isn't suitable" statement, has also been tested by sincere, and hard-working experimental researchers. It is precisely on the same level of validity and meaning; necromancy, pyromancy, and several hundred other mancies have been experimentally examined for correlation with psychological problems, by human beings of high intelligence, genuine dedication, and considerable courage. The statement is not ridiculous, nor does any psychologist have any legitimate right to take offense. Those, too, were efforts to solve the same problems he is tackling. If those earlier men had not made that effort, the modern psychologist would be in need of data of the order those earlier researchers painfully acquired. Their researches establish the basis of modern therapy, whether we oh-so-wise moderns have the courage to admit it or not.)

The problem is to make some positive statements. That's dangerous, because positive statements can be tested, where negative statements can be tested only with extreme difficulty.

A while back, I objected strongly to the humanic scientist's tendency to make "rubber" statements so hedged with qualifications that disproof was impossible. I quoted as a type statement, the proposition "Some individuals, under certain conditions of stress, occasionally display a tendency to rise vertically in the air and rotate rapidly around

a horizontal axis." That statement can never be disproven; it's a positive statement all right—but of such a nature that it is immune to any logical attack. To disprove it, a set of a high-order transfinite class would have to be tested individually. If you tested all the people on Earth, I could say, "Well . . . you didn't test them under the right conditions of stress. And perhaps the individuals who had the tendency didn't display it that time you tested them; after all, I said they only *occasionally* display the tendency, even when present."

The hellish part of this problem is that there are circumstances under which precisely such statements, and only such statements, are possible! It's true that they are practically useless statements; they serve only to call attention to the fact that a certain possibility exists. A perfect example of precisely such a statement is "Some individuals, under certain conditions of stress, have occasionally displayed the power of clairvoyance." That is a perfectly valid statement; it can be fully documented, and a number of solidly confirmed instances exist.

But we can't *use* the statement, because of that set of high-order transfinite factors to be exhausted before knowledge of *what* individuals under *what* stress will display their tendency in *what* circumstances. The phenomenon is real; we can't use it.

The humanic sciences have that
(Continued on page 158)



FALSE PROPHET

There are times when it is exceedingly unwise to tell the truth—and the Nidorian was dedicated to truth. The Earthmen were wiser; they lied about him.

BY ROBERT RANDALL

Illustrated by van Dongen

The last thing that would have entered Norvis peRahn Brajjyd's mind would have been a ceremony centering around his esteemed classmate, Dran peNiblo Sesom. Dran peNiblo, being honored for something? Impossible, Norvis thought. Dran peNiblo was a bedraggled little Nidorian from the slums of Tammulcor, and, as far as Norvis knew, he had done nothing in his two years at the Bel-rogas School of Divine Law but occupy space in the classrooms.

Norvis shook his head, trying to clear the cobwebs away. It had been a long, hard night of work and brooding—mostly brooding, unfortunately—and Norvis took it most unkindly when young Krin peBor Yorgen, the first-year man who did the waking-up duties for Norvis' floor of the dormitory, awakened him an hour before the usual Bel-rogas reveille.

Norvis had had just three hours of sleep, and he was thoroughly unhappy at the sight of Krin peBor's shining young face peering in the door ahead of time.

"Rise and shine, Norvis peRahn," Krin exclaimed, in an all-too-cheery voice.

Norvis opened one eye quizzically and squinted out the window. It was still gray outside; the Great Light was not yet bright in the sky.

"What are *you* doing here at this hour?" Norvis asked. "It's an hour to reveille, maybe more."

"Not today," Krin said brightly. "Special ceremony this morning.

Smith himself just came around to tell me to get everyone up early."

"Oh," Norvis said, and sank back under the covers, thinking that Smith had a lot of nerve calling a morning ceremony after he'd been up most of the night. He shut his eyes hard, trying to pretend it was all a dream.

A moment later he opened them cautiously. Krin peBor was still standing there, arms folded.

"You'd better get up, Norvis peRahn," he said. "This is something special, according to Smith."

"He's not going to miss me," Norvis told him. "The School's big enough that they'll never notice I'm not there. Go away."

He slumped back and shut his eyes a second time, only to find Krin peBor shaking him vigorously by the shoulder.

"Will you go away?" Norvis said. "I want to sleep—and you can tell that to Smith if you feel like it."

"Sorry," Krin said cheerfully, "but Smith gave me special instructions that you were to be there. So I guess you don't have any choice."

"I guess not," Norvis grumbled, and dragged himself out of bed. "What's going on, anyway? You have any idea?"

"Sure," Krin said. "They're honoring Dran peNiblo. Giving him the Order of Merit, Smith said."

It took a moment to register. Then Norvis said, "What?" He sat down again. "Dran peNiblo, getting honored? For what? That fumblewit can't even find his way

to class without having trouble."

Krin peBor shrugged. "I don't know why either," he said. "But the Earthmen do funny things sometimes." He gave Norvis a look intended to convey deep meanings, but which merely seemed ridiculous on his youthful face.

Norvis shook his head. "Dran peNiblo! I don't get it."

It was, on the face of it, incredible; Norvis told himself, as he reluctantly pulled himself out of his bed, still red-eyed from his long night of wasted effort. Still puzzled, he rose and groped for a fresh vest. Krin peBor, seeing that Norvis was definitely up to stay, smiled politely and ducked out. A moment later, Norvis heard him thundering on the next door down the hall.

Norvis stared balefully at the heap of papers on his desk, at the two or three scratched notes that had been the only products of his night's labors. His project was nearing completion—that was obvious—but last night he had come to the jarring discovery that, with the end in sight, he was not at all anxious to finish.

His specialty was genetics, like that of his mother's illustrious father, Kiv peGanz Brajjyd. Norvis had been working fairly closely on his project with Smith, the enigmatic, bearded Earthman who was the leader of the Earthmen on Nidor. Both he and Smith were sure that the project would probably make him a national hero, a member of the Order of Merit, and all

the other things, but some nagging doubt at the back of his mind kept him from handing in the completed work to Smith. The worst part of it was that he didn't know *why*; he was simply reluctant, and until he found out the source of his reluctance he was determined to go no further on the project.

He scooped up the papers and shoveled them into his file, and clicked closed the combination lock. Then, smoothing his golden facial down with his fingers to make himself more presentable, he started downstairs. From outside, he could hear the sounds of the gathering starting to form in the square.

He still didn't believe it. Dran peNiblo, being honored? For what? What was the little rodent capable of, Norvis wondered, that could ever make him the center of any such affair?

For a bleary-eyed moment Norvis considered the possibility that it was all a hoax instituted by Krin peBor for some obscure motive. It was unlikely, but it was more conceivable than the idea that Dran peNiblo had done something worthwhile.

Yet, when he emerged from the dorm and crossed the square to the main building of the School, he discovered that all was actually as Krin peBor had said. On the little platform usually erected for such events, Norvis could see the tall, solemn-faced figure of the Earthman Smith, the rotund figure of Mom

peDrogh Yorgen, Head Grandfather of the Bel-rogas School, and, standing between them, looking impossibly thin and meek, Dran peNiblo Sesom.

It just doesn't figure, Norvis told himself, as he drew closer. *It just doesn't add up at all.*

He joined the outermost edge of the throng, edging in to a little clump of upperclassmen who were standing together. They greeted him morosely; they were, obviously, just as sleepy as he was.

"Did I hear right?" Norvis asked. "Are we all down here to see Dran peNiblo get glorified?"

"Precisely," said a tall, bored-looking student named Kresh peKresh Dmorno, who came from the western coast of the gigantic landmass that was Nidor's one continent. "We were just discussing the improbability of it now."

Norvis nodded and flicked a glance at the platform. Smith, Dran peNibro, and Grandfather Morn peDrogh were standing there waiting for the School to assemble.

Smith, who had guided the School for years, who had been there in the days when Norvis' parents were students there—though he had not been a member of the original party of Earthmen who had come down to Nidor eighty-four years before, descending from the sky to found the Bel-rogas School and help bring the Law to the Nidorian—Smith was standing there, stroking and smoothing his graying beard, waiting calmly and patiently.

Grandfather Morn peDrogh was darting nervous glances around, and occasionally turned to mutter something to Smith, at which the Earthman would hold up a hand in pardon. Apparently he was apologizing for the tardiness of his students; Morn peDrogh was much more of a stickler about those things than his predecessor, old Gils, peKlin Hebylla.

As for Dran peNibro, the little fellow looked utterly ill at ease. As usual, his golden body down seemed waterlogged and unkempt, and his eyes were dull and dreamy. It had long been a mystery to Norvis—and, apparently, to some of the others—how Dran peNibro had managed to get past the Examiners. The Bel-rogas School, after all, skimmed off only the cream of Nidorian youth, with an eye toward grooming at least some of them for the priesthood and later the all-powerful Council of Elders. Indeed, with the selection of Norvis' grandfather Kiv to head the Brajjyd clan last year, the Council of Elders was at last composed entirely of Bel-rogas alumni. All sixteen clan-heads had studied at the School. It was quite an accomplishment for an institution which could trace its lineage back only four generations. On Nidor, where recorded history stretched back thousands of years, four generations was an incredibly short span of time for anything like that to come about.

But Dran peNibro? What could they be grooming *him* for? He was

just about fit to raise psych-beans like any other peasant, or perhaps work in the stables, tending deests. But yet there he was, planted up there between Smith and the Head Grandfather. And now, Morn peDrogh held both of his arms above his head. The crowd stilled. Norvis leaned forward to hear better. He was curious to find out just what this was all about.

"My children," the Grandfather said in his solemn voice, "your attention, please." The priest waited for the low hum of conversation to die out, smoothing his hands against his blue tunic impatiently, then went on.

"We are here this morning to ask the blessings of the Great Light upon one of our members. Let us pray."

Everyone turned to face the east, where the morning glow of the Great Light was already showing a pearly gray through the eternal cloud layer of Nidor.

"O Great and Shining Father," the priest intoned, "favor us this day by shedding Your holy light and Your ineffable blessings upon us all. And favor especially those of us who have diligently worked in Your holy Cause. And favor especially one of our members whom we, Your servants, are to honor today for his work in Your Great Plan.

"Favor us, then, O Light of the World, by giving special grace to Your servant, Dran, the son of Ni-

bro, of the noble Clan of Sesom, for the work he has done for Your people."

The invocation was over. As one, the group turned back to look again at the platform.

Dran peNibro still looked as snivelly and as stupid as ever. Norvis felt it quite unlikely that the Great Light had paid any attention to the prayer.

Smith, the Earthman, stood up. "In order for all of you to understand what this young man has done," he said, "we must take a look at the world's food supply and examine its fundamental nature.

"The principal crop, which is the basic food of all Nidor, is the psych-bean," Smith said. "Now, while it is truly written, 'We do not live on psych alone,' it is, nevertheless, our most important crop. Because of its versatility, it may be used for many things: its leaves provide us with fiber for our clothing; its stalks can be used as fuel or deest-fodder."

Norvis exchanged wary grins with the man standing next to him. "Next he'll be telling us that the stuff we breathe is air, and how important *that* is," the other whispered.

"No," Norvis whispered back. "I think, after judicious consideration, that he will remind us that water is, after all, very wet."

"You can see, therefore," Smith continued, "what a boon it would be if some method were discovered to aid the farmer in producing psych-beans. Dran peNibro has

been concentrating on an approach to this problem.

"Those of you who have been studying agronomy know how the soil is enriched by fertilizers, of course. What Dran peNibro has done, very briefly, is discover a way to increase the per acre yield by nearly one hundred per cent, by means of a new growth hormone which—"

Norvis peRahn Brajjyd's wandering attention snapped back suddenly to what the Earthman was saying. Growth hormone? It couldn't be! That was his own pet project!

He strained his ears to hear Smith's words more carefully.

"... Which permits the plant to make more efficient use of the soil. Although the cost of producing this new substance is high, very little is needed for each plant, a matter of a few drops injected into the taproot of the psych plant itself.

"Naturally, the exact process will remain a secret, to be kept in the possession of Dran peNibro and his descendants, in order that he may reap the proper profit due him by virtue of his work."

Norvis peRahn felt the golden fuzz on the back of his neck prickle. *Smith had quoted almost exactly the words in his own notebook, locked upstairs in his file!* He sputtered in rage. Why, that little sneak of a Dran peNibro had stolen his work!

Norvis rocked back and forth for a second or two, much too bewildered to be able to do anything at

all. The events of the entire morning had been insane, unbelievable.

On the platform, Smith, with great show of ceremony, had taken a small box from his voluminous robes and had handed it to Grandfather Morn peDrogh. The Grandfather turned to Dran peNibro, who was yet to open his mouth. He was standing there, smiling insipidly.

Grandfather Morn opened the box and brought forth a magnificent ribbon with a gleaming medal dangling from it. The assembled students suddenly became terribly quiet.

"Dran peNibro," he said sonorously, "kneel."

The little man knelt humbly. Grandfather Morn looked upward, where the Great Light was breaking through the clouds, and then down at the kneeling Dran peNibro. Norvis froze.

Solemnly, the Grandfather said, "The Blessings of the Great Light are upon you, Dran peNibro, for the brilliant work you have performed here at the Bel-rogas School. It is only fitting then," he said, starting to slip the ribbon around Dran peNibro's thin neck, "that we, by virtue of the power vested in us by the Council of Elders, hereby invest you with full and unqualified membership in the Order of—"

Norvis could take no more.

"*Stop!*" he roared. The sound of his voice broke the dead silence that had prevailed. He heard the word ricocheting off the buildings and

echoing back, bouncing around the square.

All eyes turned on him. He felt terribly alone in the midst of the crowd.

"What does this interruption mean?" Grandfather Morn asked sternly. His eyes were blazing with rage.

Norvis took a step backward, and noticed that everyone around him was edging slowly away from him. He tried to speak, but couldn't find words.

"I repeat," the Grandfather said, "what did that outburst mean? Why did you tell me to stop?"

Again Norvis struggled to speak, and this time he found words.

"Dran peNibro is a *thief*," he shouted. "The growth hormone was my project. He stole it from me!"

"This is a very unusual charge," the Grandfather said cautiously. "What proof can you offer?"

"Ask Smith! Smith knows! He knows I was working on it. I was almost finished with it. Go ahead, Smith. Tell him! Tell him that Dran peNibro stole my project!"

Norvis felt his hands quivering. He was no longer afraid; he was burning with righteous indignation.

Smith remained silent. "Go on," Norvis urged. "Tell him all about it."

"Dran peNibro has been working on this project for over a year," Smith said quietly. "He has been reporting to me regularly. I know of no other project in the School

which was even remotely similar."

Grandfather Morn peDrogh frowned. Obviously the whole scene was very distasteful to him, and he was unsure of how he was going to recapture the dignified tone of the ceremony.

"Did you hear that, Norvis peRahn?"

"It's a lie!" Norvis yelled. "I was working on the project. Dran peNibro wouldn't know a hormone from a deest's bray without a picture-book. That was *my* project, and he stole it—and Smith knows that! Smith's *lying*!"

Overcome by rage, Norvis pushed his way through the crowd, heading blindly for the platform, where Smith awaited him, arms folded calmly. Norvis kept repeating, over and over again, "Smith lied. The Earthman lied."

Then suddenly a powerful hand was clamped over his mouth, and two more seized his arms. He struggled, kicked wildly, bit at the hand. It had the alien odor of an Earthman's skin, and then Norvis sensed the acrid taste of an Earthman's blood—but the hand stayed right there. He was in the grip of two of the Earthmen, and they were dragging him away, back from the platform, and then farther away and into one of the buildings. He continued to fight and shove, and as they hurled him, still protesting, into an open door, he heard the droning voice of Grandfather Morn peDrogh proceeding with the ceremony, as if nothing had happened.

The long road that led from the capital city of Nidor, Holy Gelusar, to the great eastern seaport of Vashcor led southeast to avoid the Mountains of the Morning, a branch of the mighty range of the Ancestral Mountains that ran east and west across the continent, separating the rugged northern province of Sugon from the more fertile plains of the south.

The traffic was not heavy along the road; the easiest method was to take a river packet from Gelusar, traveling down the Tammul River to the southern seaport of Tammulcor, and take a coastal ship around to Vashcor. But that cost money, and Norvis peRahn had precious little of that. He had six twenty-weight notes in the wallet of his vest, and two six-piece coins in his pocket, making a hundred and twenty-one weights in all. Not much money to last a man for very long.

He tried not to think of his personal problems, but every step of the way they drifted back into his mind. A glance at the bleak crests of the Mountains of the Morning reminded him of the story his mother had told him about a secret place of magic the Earthmen had somewhere in those jagged peaks. Sindi iRahn had told the story many times, always cautioning young Norvis not to tell anyone else, and at the same time instilling in him a certain suspicion of the Earthmen that had been more than amply confirmed now.

The sight of the Mountains, re-

minding him of his mother, reminded him in turn of her tears when she learned that he had been expelled from the Bel-rogas School, as a result of the scene he had caused that day.

The first student expelled in the four-generation history of the School had received a lukewarm reception at home. His father had tried to understand, but it was obvious that he did not believe Norvis peRahn's story. After all, would an Earthman lie? And where were the notebooks that Norvis claimed to have kept? Why weren't they in his locker?

Norvis had tried to explain that they had been stolen, but his explanation fell on deaf ears.

Grandfather Kiv peGanz had been positively icy, but just. The gruff old man had given him the money for the trip, and asked him to take himself as far from Gelusar as he could get. There were no jobs open for a young man who had publicly called an Earthman a liar and tried to take credit away from a deserving fellow-student.

So, alone and more than a little bewildered, Norvis had left Gelusar, all his proud hopes ended.

The road to Vashcor was not a short one to begin with, but even the easy loping gait of the deest he was riding could not soothe the anger that boiled up inside him, and that anger only seemed to make the journey longer.

Why had the Earthman lied? Why had the notebook been stolen? And why, above all, had the secret



been given to that runted little blockhead, Dran peNible Sesom? Was it because his great uncle was Grandfather Golis peGolis Sesom, one of the most powerful of the Elders? But what difference would that make?

None of it made any sense. The only thing that made sense was his deep hatred for the Earthman, Smith. And the other Earthmen, too. McKay and the others must have known what Smith was doing. They must have known that Norvis peRahn would denounce the theft of his idea; otherwise, why had two strong Earthmen been in readiness, prepared to drag him away from the ceremony as soon as he opened up?

For some reason known only to them, the Earthmen had contrived to ruin his life. They had stolen the secret that would have made him famous, and they had stigmatized him in the eyes of the world forever. Why? What went on in the alien brains behind those strange eyes?

Norvis peRahn turned the problem over and over in his mind during the long journey, but he never seemed to come up with an answer.

The Grand Harbor of Vashcor shimmered greenly in the diffuse illumination of the Great Light. Here and there were tall masts of the seagoing vessels, and dotted among the bigger ships were swarms of smaller boats rolling lazily on the incoming tide.

Norvis peRahn watched one ship

as her sails caught the wind at the harbor mouth and she moved majestically out into the open sea. The Grand Harbor was almost ideally sheltered, surrounded as it was by high cliffs which protected the bay from the wind. The little paddle-wheeled steam tugs pulled the bigger ships out to the harbor mouth, past the cliffs, to where the wind could push them out to sea. Then they would wait until another ship came into the channel and tug them into port when their sails dropped and sagged idly in the still air of the harbor.

It was almost unbearably hot, even for Norvis, who was used to this sort of weather. The humidity made his body hair cling to his skin; he felt sticky and uncomfortable.

He also felt hungry.

He wasn't quite sure whether he should eat immediately or wait until he got even hungrier. He was beginning to wish he hadn't been in such a hurry to sell his deest. After eighteen days, his money was getting low, and he hadn't found a decent job yet. Oh, there were plenty of jobs around, if one wanted to do any sort of thing. Street cleaning, stable sweeping, bilge scraping at the drydocks—none of them appealed to him and none of them offered any chance of advancement. Still, if things got much worse, he might have to take on a menial job just to eat and pay rent in the small hole-in-the-wall he had found.

The trouble was, all the decent jobs were pretty well sewed up by

the guilds. Of course, the letter he had from Elder Grandfather Kiv peGanz *might* allow him to get past the guild barrier, but he thought not. It would have, ordinarily, but the news of his expulsion had already preceded him to Vashcor. No one would want anything to do with him when they found out who he was.

There was one other way. It was rough work, but if a man had brains he could get somewhere eventually. He watched the flying sea-lizards float lazily in the faint updrafts from the water and thought the proposition over.

Finally, he took a three-piece coin from his shorts pocket and flipped it into the air. The bronze disk twinkled as it spun up and dropped back to his hand.

If it came down "prayers," he'd try for another five days; if it came down "price," he'd go to the Shipmaster's.

He looked down, wondering if he'd see the lettering of the prayer inscription or the graven figure 3.

The number looked up at him. It was "price."

The Shipmaster's was a huge, square building that had been erected a thousand years before. The stone, like that of any other ancient building, was weathered and pitted, and the stairs that led into the main entrance were deeply worn by the passing of hundreds of thousands of shod feet.

The man behind the desk marked

Mercantile Enlistments was wrinkled and old; his facial down was silvery with age.

"Good day, Ancient One," Norvis said politely. "May the Great Light bless you."

"Bless you, too, son," the oldster said sharply. "What do you want?"

"Enlistment in the Mercantile. Any openings?"

The old man narrowed his eyes. "There's always openings for a man who likes the sea. What's your name?"

"Norvis peKrin Dmorno," Norvis lied. The Dmorno clan was large and centered in the far west; it was a safe alias.

"Can you read and write?"

"A little," Norvis admitted cautiously. He didn't want to admit that he'd had much schooling, but it might be difficult to disguise the fact that he was literate.

"I have an opening for a scrub-hand, usual four-year terms. Do you know what that means?"

"Stay on four years. Money is paid at the end of the enlistment. If I skip ship, I forfeit all rights to the money."

"That's it," said the old man. He pushed a piece of paper and a pen across the desk. "Sign the bottom line."

Norvis glanced at the paper, then looked up. "This is an eight-year contract, Ancient One. I only want four."

The old man pulled the paper back. "You can read, I see. All right, try this one." He pushed out

another paper. This time, Norvis signed.

It was an old trick; if a man couldn't read, they'd hand him the longer term contract. He would think that he was free after four years and come to the office to collect his pay; often, he'd miss his ship. Then—no money.

Norvis knew that his first ship would be going to the Bronze Islands for metal cargoes. They wouldn't take a chance on giving a new man a ride around the coast; he simply might be trying to get back home again for nothing. They couldn't let him skip ship to his home port after only one voyage.

The old man gave him a slip of paper. "Go back to Room Thirty-four. You'll be assigned to the *Balthar*, under Captain Del peFenn Vyless."

Norvis nodded and headed for Room Thirty-four.

Four years of life at sea helped Norvis become sure of himself. He started out cleaning ship and waiting on the crew. The sailors, all guild members, did nothing but sail the vessel; none of the dirty, grimy jobs for them. That was for the swabhands, not for skilled labor.

It wasn't much of a life, for a man used to the comparative ease of the School. He took orders, but he didn't take them happily. He always carried them out to the best of his ability, though. It didn't seem wise to get juggled out of the

one remaining source of income he had.

After the first two trips, he found himself starting to rise aboard ship. He grew in responsibility, and the sailors began to accord him the privilege of a greeting. It was obvious to all, particularly Captain Del peFenn, that this was an unusual swabhand; he quickly rose to first rank among the swabhands, which was a small victory, true enough, but a victory none the less.

At the end of his first year on the *Baltbar*, Norvis was eligible for membership in the guild, and he was voted in by overwhelming acclaim of the full-fledged sailors on board, with Captain Del's hearty approval. They gave him his certificate on the first really long journey they undertook, out around the coast to the distant seaport of Sundacor. Someone had painstakingly inscribed "Norvis peKrin Dmorno" on it, and he smiled over it; for all intents and purposes, now, Norvis peRahn Brajjyd was dead and forgotten. It was just as well.

He rose rapidly in the guild; at the end of his second year, he was elected Spokesman by his fellow crew members, in deference to his eloquence and superior intelligence. By now there was more than a little speculation aboard ship on the topic of Norvis peKrin's doings before joining the Mercantile, but he said nothing, and no one asked.

From there, the step up in the hierarchy was rapid and inevitable. He was made second mate by Cap-

tain Del peFenn, a powerful, dynamic man with an overbearing bass voice and vivid contempt for some of the most deeply-rooted Nidorian mores. Captain Del came from a long line of ship owners, and the Seamen of Vashcor had always been fairly detached from the theocratic mainland life.

For long hours as the *Baltbar*, wind in its billowing sails, moved in dignified fashion over the sea, Norvis would sit, quietly nodding, while the captain would express opinions which would undoubtedly have resulted in his stoning, were he a landsman. Gradually, the captain unburdened himself more and more bluntly. He feared the power of the Council of Elders, who had immediate control over his cargoes and were always happy to tithe him at both ends. He bitterly resented this, as had his father before him and *his* father, no doubt, but it was the first time any of them had a chance to unload this resentment to another.

Norvis, without committing himself, managed to let the captain see that he was in at least partial agreement. It took an effort occasionally, for Norvis did not actually hold the same animosity for the council that the captain did, and when Del peFenn spent the better part of an evening attacking the Elder Grandfather Kiv peGanz Brajjyd, it was all Norvis could do to restrain himself. After all, honor and love for one's ancestors was set forth on the very first page of the Scriptures, and

little as Norvis cared for old Kiv, he still respected him both as an Elder and as his own grandfather.

Del peFenn's grievance against Kiv was a simple one: his father, Fenn peFulda Vyless, had held a stranglehold on the shipping of Edris powder from one part of the world to another. When the youthful Kiv's revolutionary genetics work had ended the entire Edris industry, these contracts were voided, leaving Fenn peFulda temporarily bankrupt.

Even though he had built up his fortune again, and Del peFenn had increased it twofold, they retained this bitterness, and the captain returned to the subject of Kiv peGanz Brajjyd more than once.

As the months moved on, the captain and his former swabhand grew quite close. And, when, in the third year of Norvis' time on board, a prematurely lowered boom carried Charnok peDran Yorgen, the *Balthar's* first mate, overboard, never to be recovered, who else was the logical replacement but Norvis peKrin Dmorno?

As first mate, Norvis moved up to the second-best cabin, just next to the captain's, and his wage went up considerably. In odd moments, it pleased him to contemplate the amount of money that was accumulating for him, to be paid in a lump at the end of the four-year voyage.

Each time the ship put in port, it was his task to supervise loading and unloading of cargo, and to

break in the new men Del peFenn was forever hiring. The swabhands had the occasional habit of jumping contract, apparently preferring to lose their pay for the year rather than sweat out three more of the same, and hardly a stop was made without some new swabhand coming aboard. They were generally tall, gawky boys, too restless to make good farmers and not clever enough to get into Bel-rogas.

After a while, Norvis came to realize why his rise to the top had been so easy: he was a veritable intellectual giant among sailors. Since every sailor began as a swabhand, and since the swabhands were always green boys without education or any particular ability, a man with several years of the Bel-rogas School behind him stood out aboard ship like the Great Light over the mountains.

And then, on a warm afternoon in Norvis' final year of duty, Ganz peKresh Danoy joined the crew.

"We've got a new swabhand," Captain Del told Norvis. "He's down on the forward deck now, getting some of the smell of the sea into his lungs."

"Another green kind, eh?" Norvis said. "Well, I'll make a sailor out of him before long."

The captain smiled. "Maybe you'd better go down front and see him before you decide on anything." There was a strange expression on his face, and when Norvis got his first view of Ganz peKresh Danoy he understood.

Ganz peKresh was no green recruit—not by thirty years, or so. He was a man of middle-age, short, stooped, not very intelligent-looking. His blunt, flat face had the blank and bewildered appearance of a man whose life has been shattered after fifty years of complacent routine.

"You're the new swabhand?" Norvis asked, just barely managing to conceal his disbelief.

"That's right, sir," said Ganz peKresh. He spoke in a dull monotone, and his voice had the nasal twang of a farmer from the bleak, hilly province of Sugon.

"You're older than our usual run of men, you know."

"I know, sir. But this is all I'm fitted for." He spread his hands in an eloquent gesture of defeat and despair. Norvis felt a sudden twinge of premonitory fear.

"What do you mean?" he asked anxiously.

"Sir, you don't know? What's happened to us?"

Norvis' expression became grim. "No," he said slowly. "Suppose you come back to my cabin and tell me all about it. I'm somewhat out of touch with things." It was not the custom for officers to invite swabhands to their cabins, but Norvis wanted to be sure this would be a private conversation—and his respect for custom in general was rapidly dwindling anyway.

The story Ganz peKresh unfolded was a gloomy one. He had been, as Norvis had guessed, a farmer

from Sugon. He had a small tract of barely marginal land on the southern tip of the province, in the foothills of the Ancestral Mountains. The farming there had never been profitable in the first place; the hundreds of small farms there, raising peych-beans almost exclusively, operated on just the flimsiest dividing line between profit and loss, with loss meaning starvation.

Norvis nodded. He knew the situation in that part of Sugon; he had studied it, back in those almost-forgotten days when he had been working on the growth hormone project.

He suddenly grimaced at the memory. He had succeeded in burying it deep, the whole sordid business of the trumped-up ceremony for Dran peNibro, his expulsion and discrediting, and everything else. And now, it came flooding back and hit him hard.

"Something the matter, sir?"

"No . . . no," Norvis said. "Suppose you get on with your story. How come you left your farm?"

"Well," Ganz peKresh began hesitantly, "it . . . it was this new thing. The new thing that the Elders had. I don't know what it is, but all of a sudden I couldn't sell my crop."

Norvis stiffened. *Those Earthmen!* he thought savagely. All the old hate and bitterness surged up again now. He set his jaw. "Tell me," he said, trying to seem sympathetic. "Tell me all about it."

"There's not much to tell. The

Elders got something from that School to make their farms prosper, and suddenly the price of my beans dropped to nothing. I . . . I . . . I had to sell my farm. I couldn't meet the competition."

"Something from the School, eh? And they gave it to the Elders?"

"That's right, sir. There was a big ceremony at Gelusar, I remember; people came from all over. And one of those Earthmen presented whatever this was to the Council and—and the next I knew, Elder Danoy bought my farm from me, and the only way I could stay alive was to go to sea. So here I am." He smiled with false gaiety; it was a weak, pathetic attempt at expressing an emotion he did not feel.

Norvis stood up. "The Elders kept it to themselves, eh? Just like them," he muttered. *They took my hormone, he thought, and of course, produced it in a limited supply—all of which the Elders took for themselves.* He paced up and down, ignoring Ganz peKresh. *So the Elders are getting richer and richer, and the small farmers are being squeezed off their land.*

He turned. "All right, Ganz peKresh. That'll be all for now. I'll explain your duties in the morning."

"Thank you, sir," the farmer said humbly. "May the Great Light illumine your mind as He does the world."

Norvis sat alone in his cabin for a while after the farmer had gone,

struggling to control himself. He felt, once again, the same righteous indignation he had experienced on that long-gone day in the square in front of the main Bel-rogas building, when he had shaken his fist at impassive Smith and called him a liar in front of the whole School.

What did the Earthmen want? Why were they doing this? It could only be the Earthmen, Norvis thought. They were the ones who had stolen his notes, who had trumped up his expulsion, who had seen to it that the Council of Elders had managed to get control of his growth hormone. Naturally, with the already rich Elders growing wealthier, and with the greater supply of peych-beans bringing down the asking price and cutting the small men out of the bidding, the Earthmen's action was going to have disastrous consequences for Nidor's carefully balanced economy, which had been happily stable for thousands of years. There was no room in it for a small, tight group of very wealthy men, and that was the situation being created.

Deliberately. They were deliberately changing the old ways, twisting, distorting, burying the Scripture and the Law under the weight of their innovations and manipulations. Norvis shivered with the strength of his realization; it occurred to him that he might be the first Nidorian ever to suspect that the Earthmen might not be as virtuous as they claimed to be. It was a staggering thought.

"But it's not too late to return to the old ways," Norvis said aloud. The Earthmen had been on Nidor not ninety years, and ninety years was but a moment in Nidorian history. The damage could be undone—if someone acted in time.

He blew out the candle and went on deck to find the captain. Del peFenn liked to stand this watch himself; it was a long-ingrained custom of his.

"Hoy, captain!"

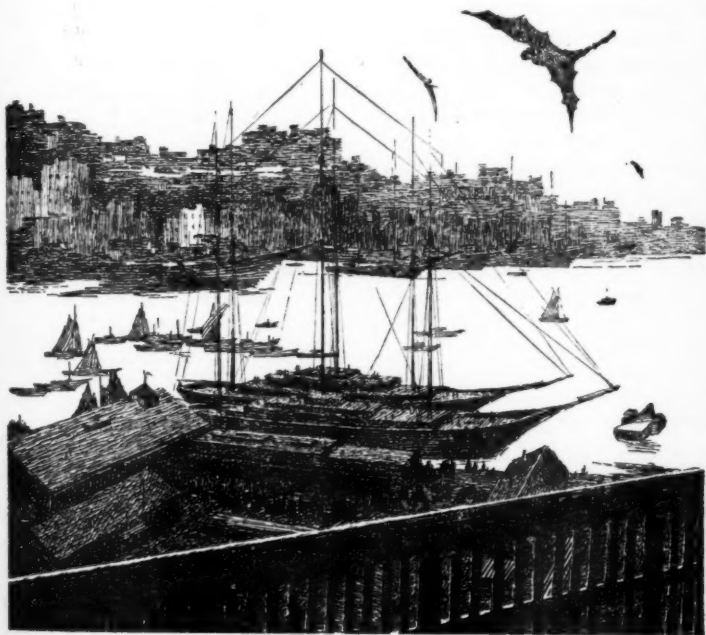
"Hoy, Norvis." The captain was standing alone on deck, with the

evening drizzle starting to come down. He was staring out into the grayness; the Lesser Light was out, and its faint beam illuminated the harbor of Gycor.

"I've just been talking to the new swabhand, sir."

"Oh?" Del peFenn did not look around, but continued to stare out at the sleeping city. "Did you find out what a man his age is doing signing up as a swabhand?"

"Yes," Norvis said. Quickly he explained how Ganz peKresh had lost his farm, not bothering to men-



tion his own part in the development of the growth hormone.

Captain Del cursed vividly when he had heard the whole story. "Those Elders! It's a wonder the people don't rebel! How many thousand years is it that we've lived so infernally at peace?"

"The Elders aren't at fault, sir. It's the Earthmen who are responsible," Norvis asserted.

"Hm-m-m. Maybe so," the captain said, after some thought. "But I've never trusted those old men anyway. They're probably busy conniving with the Earthmen right down the line."

"Sir—"

"What is it, Norvis?"

"We're heading to Tammulcor next, aren't we?"

"That's right. Straight around the coast, to Tammulcor."

Norvis nodded. "I'm going to ask for my release when I get there. I think I can do something about this whole business—at least I'm going to try."

"You're crazy," Del told him calmly. "You can't fight the Elders. The whole world's bound hand and foot to them. It's always been that way."

"I'm not thinking of fighting the Elders, sir. I don't want to fight anyone. I just want to open people's eyes! They're all blind, everyone, and they're being led right over a cliff."

Captain Del was silent a long while, and there was no sound

aboard ship but the steady splutter of the rain against the wooden hull of the ship, and the plinking of the drops into the water of the harbor. After a while he said, "You'd be smarter to stay with me. I don't have any children, Norvis. If you stayed here, you might just find yourself a shipowner yourself some day."

"No, sir," Norvis said. "I appreciate all you've done for me—but I think I've got a job to do on the mainland."

"Very well," the captain said. "I won't hold you back. I'll give you your release at Tammulcor. But I want you to know I'm not anxious to lose you."

"Thank you, sir."

"And when you come creeping back here with your tail tucked between your legs, remember that there'll be a place ready for you on the ship at any time."

"You don't seem very confident that I'll get anywhere, do you, sir?"

"No," said the captain. "No. I'm not."

The rain continued to pour down. Neither of them said anything further.

Norvis went ashore at the large port of Tammulcor, four years' pay weighing down the pocket of his seaman's tunic. The first thing he decided to do was to spend some of it on clothes; a sailor's uniform would be somewhat conspicuous on Gelusar, and he had no intention of

calling attention to himself until he had made a few inquiries.

He bought several well-tailored vests and shorts and packed them into a new clothing carrier. Then he checked on the schedule of the next river-packet upstream to Gelsius. He found he had a few hours to kill.

So, still wearing his uniform—there was no danger in a coast-town like Tammulcor—he strolled into a waterfront beerhouse and ordered a glass of the heavy, warm brew that was the favorite drink of Dimay Province.

"May the Great Light illumine you, barman," he said. "What news from the Holy City?"

"May He illumine us all," replied the barkeep. "I've heard nothing much, seaman. Just about the same as yesterday." It was the common reply, and meant nothing. If there was any news, it was yet to come. "That will be one weight and two," he went on, setting down the tankard of foaming brew.

"One and two?" Norvis asked in surprise. "That's rather cheap, isn't it?"

The barman nodded as he took the money. "It is. A tankard has sold for one and six as long as I can remember. My father, great be his name, sold it for that, and so did his father before him. It covered expenses well. But now, with the peych-bean selling so cheaply, making the brew is cheaper, too. Others cut their price, so I had to as well. But it doesn't matter; the

profit remains the same, and that's all that matters."

Then he paused and looked toward the north. "News from Gelsius? There is some, I think. There have been more farmers who have lost their holdings all over Nidor, of course, but most of them have been around the Holy City. However, it's been said that the Elder Grandfather Kiv peGanz Brajjyd is still holding out. He won't use the new fertilizer-stuff on his own farms; he says it's not according to Scripture." The barman grinned. "'Course, he hasn't said anything about it in Council. I dare say he ain't intending to get the other Elders riled."

"I've been at sea for four years," Norvis said. "How come only the Elders are getting this whatever-it is?"

"Oh, it's not *just* the Elders. There are others who are getting some of it, but not many. Seems as though the stuff was invented by one of the Elder Grandfather's nephews, or some such. Anyway, it took a lot of money to build the equipment to make it, so this Elder got some of the others together and they chipped in to back the boy. The understanding was that they would get first crack at it, and what money they made would be used to make a bigger plant so that other farmers could get the Grome, too. It's a long-range plan, of course, but it's a good one. After all, I understand there was some difficulty three hundred years ago, when they

brought the steam engine in. It'll take time, that's all. Just time."

"I suppose so," Norvis agreed. *So Grandfather Kiv peGanz is still holding out, eh? Interesting. What was it the barman called the growth hormone? Ab—Grome; that was it. Grome.*

He finished his beer and laid coins on the bar. "Here you are, barman. This is the four pieces you should have made."

"May the Great Light illumine you, sir." He scooped the coins off the bar with a practiced hand as Norvis strode out of the bar.

He spent the rest of the time before the riverboat left walking the streets of Tammulcor, thinking over what he'd learned. So little-snot Dran peNiblo was in business now, eh? Making himself quite a pile, too, no doubt. And by stealing another man's work!

Well, we'll see about that, me buck. The Earthman, Smith, was pulling a fast one on all of Nidor. Of that Norvis was sure. The set-up was obvious.

What they intended to gain, he didn't quite know—but then, who could ever figure out how an Earthman thought?

The Earthmen had come down from Heaven, from the Great Light Himself, according to the stories they told. But that didn't necessarily hold water; they could have come from the Edge, far out across the Eternal Sea, where the sky met the water. Weren't there demons there, according to Scripture?

It didn't matter. Whatever or whoever they were, they were trying to ruin the old, tried-and-true ways of Nidor. By giving the growth hormone—Grome—to the Elders, they were running the little farmer out of business and making the Elders richer. It was all right for a man to make money, and a monopoly was perfectly all right, too, but not when it threatened the lives of thousands of little men.

Something would have to be done.

When the riverboat arrived in Gelusar, Norvis peRahn Brajjyd no longer looked like a sailor. He was just another well-dressed, middle-class citizen. After he found a small room in a hotel, he took a walk toward the capital's produce district, where the great psych-bean warehouses were. There, he could find out more about the situation.

It didn't take him long to find out; he could hear the hubbub all up and down Lower Temple Street.

Farmers with deest-carts loaded with the threshed psych-beans were blocking the street, straining, sweating, and swearing. He could see how it would be on Chilz Street, where the cut stalks were taken, or in Yorgen Square, where the long, fibrous leaves were pulped and made into cloth.

Pushing his way through the throng, he headed toward the Trading Building. There was a great deal of milling about, but Norvis peRahn's attention was caught by

a large group of men who were listening to a red-faced peasant talk in an emphatic voice.

"I tell you," said the peasant, "something's got to be done! We'll have to petition to our Elders—all of us! We're being ruined! I'm sure the Elders will change their plans if they see what's happening here!"

A chorus of "Yeas" came up approvingly.

"It would be different if things were getting better," he went on. "But they're not! They're worse! Two years ago, when I brought my crop in, they said the warehouses were full—*full*! And for thousands of years our warehouses have only been seven-tenths full! They refused to buy except at a lower rate! 'A quick sale,' they told me. 'So we can unload the warehouse.'"

"But they haven't unloaded! This new thing the Elders are using makes the beans ripen earlier, so they sell their crop first! It just isn't fair, I tell you!"

"What do you propose we do, Gwyl peRob?" asked one of the crowd.

"We must petition! We must all get together! They'll understand!" He nodded his head vigorously.

"All right," said another, "we'll petition and ask them to reconsider their plans. I'm a Sesom! Who'll go with me to speak to the Elder of our Clan?" Several of the crowd moved off with him, and another man stood up and declared his Clan as well.

Finally, Norvis stood up. "I'm no farmer," he said loudly, as soon as he had silence. "But I'm a Brajjyd, and I say the Clan must stand together. I'll go with you."

"Who are you?" asked Gwyl peRob Brajjyd, the red-faced speaker.

"My mother's father is Elder Grandfather Kiv peGanz Brajjyd," Norvis said evasively.

"Good, Clansman!" said Gwyl peRob. "You'll be our spokesman, then! Come, we'll round up others!"

It took two days for the committee to get an audience with the Elder Grandfather. None of the farmers had paid any attention to his name when Norvis peRahn finally admitted it, and he decided that all the scandal about his dismissal from Bel-rogas had not penetrated to the farming class, and if it had it had been forgotten.

But he knew Grandfather Kiv peGanz had not forgotten. When the two days, which Norvis had spent in some private investigations of his own at the Grome factory, were up, and the acolyte introduced Norvis and his little delegation into Kiv's study, the look on Kiv's face had nothing of the friendliness one would expect from one's mother's father.

Norvis met Kiv's cold glare for a moment, and then, seeing that the four years had not altered the old man's sternness, he knelt in the ritual bow.

"The peace of your Ancestors be with you always," Kiv said. His voice had no warmth in it.

"And may the Great Light illumine your mind as He does the world," said Norvis. He stood up. "Hello, Grandfather. Recognize me?"

"What do you want?" Kiv asked bluntly.

Just as bluntly, Norvis replied, "I want you to talk to your fellow Council members. You've got to show them what this new hormone is doing to Nidor."

Kiv smiled delicately. "My fellow Council members are well aware of what they're doing, Norvis peRahn." He paused; Norvis saw that he was waiting for a ritual apology, but that was the last thing he was going to do. The Scripture, Norvis thought, would have to be put aside for the sake of getting something done.

He waited just long enough to make Kiv uneasy and the rest of his delegation thoroughly uncomfortable, and just when everyone was beginning to fidget he said, "These people are Brajjyds." He indicated Gwyl peRob and the other farmers with him.

Kiv nodded. "I assumed they were clansmen," he said.

"They're *starving*," said Norvis loudly. "The new hormone, and the almost exclusive use of it by the Elders. Don't you see what that's doing to them? They can't sell their crops! The warehouses are full."

"I know," Kiv said in a quiet

voice. "My own farms do not make use of the new hormone, and my overseers are reporting difficulties along the lines you mention."

"The hormone—how does it square with the Scripture?" Norvis demanded.

"I . . . don't know," said Kiv. He stared past Norvis focusing his eyes on the symbol of the Great Light in the niche in the wall above Norvis' head. "This is why I have not used the hormone myself."

"But the Council—"

"The Council as a group has approved use of the hormone, on recommendation of Smith." Kiv spread his hands. "I am a minority."

"Can't you fight?" Norvis said.

"I have yielded to their greater numbers," said Kiv. "They are willing to trust the word of the Earthmen, and I do not wish to quarrel. I prefer not to use the hormone myself, but I cannot publicly take a stand that differs from the will of the Council as a whole."

Norvis looked from one member of his delegation to another. They were standing in a tight clump, and it seemed to him they were more awed by the immediate presence of an Elder Grandfather than they were concerned with their own pressing problems. Norvis told himself that they had not been through the same embittering experiences he had, and that thus they still were able to cling to the old faith.

"You won't help us, then?"

Kiv smiled. "You haven't made clear to me just what help you require, Norvis peRahn."

"Certainly I have," Norvis retorted hotly. His words reverberated loudly in the little chamber, reminding him of that day when they had echoed through the square at Bel-rogas. "I want you to go before the Council and demand abolition of the Grome hormone!"

He felt Gwyl peRob nudge him gently with an elbow. "Norvis... you're speaking to an Elder!"

"Let me handle this," Norvis muttered. "Well?" he asked.

"I have told you," Kiv said, spreading his hands. "I have yielded to the will of the Council." He closed his eyes as if he would brook no more debate.

"But it's ruining Nidor!" Norvis shouted. He was angry now; the obstinate old man was deliberately refusing to see beyond the end of his nose. "Forty years ago you nearly ruined everything with your Edris adaptation, and now you're letting the same sort of thing happen—only we won't recover so quickly!"

The Edris reference evidently stung Kiv. He straightened in his seat, and what had been the remainder of his earlier smile sharpened into a grim frown. "I can do nothing. The Council has decided. This audience is at an end."

"You can't throw me out like this!" Norvis sputtered. "Why

won't you think? Why won't you look at—"

"This audience is at an end," Kiv peGanz said icily.

Norvis started to say something, but he felt the pressure of Gwyl peRob's hand on his arm, and subsided. Drawing a deep breath, he said, "All right. If you won't do anything, I will. I'll take the matter into my own hands."

"Please go," Kiv said. Suddenly he seemed very old and tired. "This audience is at its end."

Norvis, still raging, barely managed to control himself. "I'll go," he said. "But remember—the Council's had its chance. From now on this is in my hands."

He turned and stalked out, pushing the door open himself without waiting for the acolyte to do it for him. The delegation of farmer Brajjyds followed.

When they were outside, Gwyl peRob confronted him.

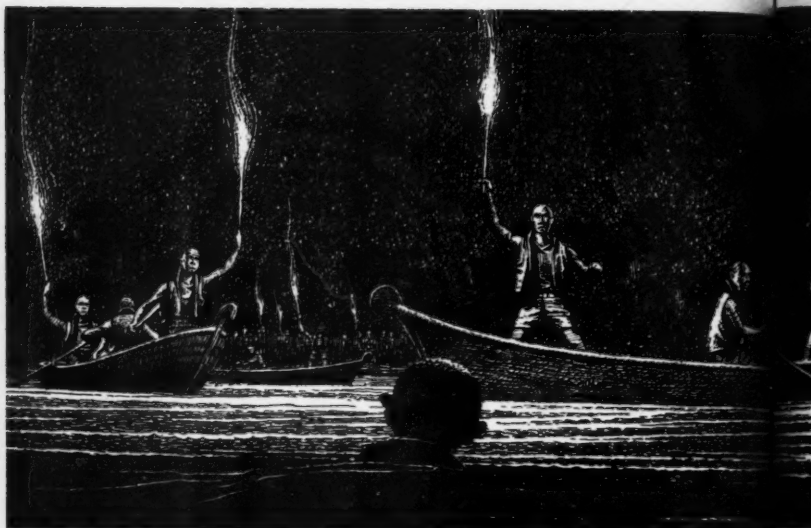
"Norvis peRahn—that was no way to address a Council member! Particularly your own mother's father!"

"You heard what I told him," Norvis said. "From now on, this is in my hands. I'll talk to Elder Grandfathers the way they ought to be talked to."

"But—"

"It's too late for buts. Come on; there's work to do!"

The mass meeting had been called for late evening. Every farmer in town had been asked to show



up at Shining Lake Park for a special address by Norvis peRahn Brajjyd, whose mother's father was the Elder Grandfather of the Brajjyd Clan.

Word had spread throughout the city, among the farming people, that something was to be done about the worsening psych-bean situation, and by the time the Great Light had gone to rest, a sizable crowd had gathered in the park. Torches had been set up in the holders that ringed the speaker's platform.

It was something new to the people: a speech given without a formal occasion. Normally, the platform at the lake's edge was used for concerts held by the various musical

groups in Gelusar who wanted to perform for the public.

At the appointed time, Norvis stood up on the platform and raised his hands to silence the murmuring of the crowd. They were used to being addressed by a priest or a public official, so they quieted down immediately despite the fact that, properly speaking, Norvis was a nobody.

"In case any of you don't know who I am," Norvis began, "I'm Norvis peRahn Brajjyd. You all know what our trouble is: this new thing that the Earthmen have given out. This newfangled Grome that doubles the crops of the Elders and robs those who don't have it of



their proper share of the crop money."

He paused and surveyed the crowd. It was growing larger by the minute, and it was a restless, shifting group of people. All the better, Norvis thought; it meant they were unhappy with the state of things.

"Farmers are being ruined!" he roared. "Men who have held their land since the times of their great-grandfathers have been forced to leave it."

Now the crowd began muttering. Norvis smiled inwardly; he was beginning to reach them.

"We know what is wrong, and we know that something has to be

done about it. The question is, what are we to do?"

"We have petitioned the Elders, and we have been put off. Our requests have been denied. And do you know why? I'll tell you why! We've been going about it in the wrong way! We've been asking for help and not getting it because we haven't been attacking the problem the right way."

He raised his voice and said, "What does the Scripture tell us? 'To destroy a thing, cut at the root and not at the branch!' And what is the root of this evil? Where has this Grome come from that is ruining our culture, our very lives?"

Norvis waited a moment and then shouted, "From the Earthmen! It is they, not the Elders, who must be approached! The Elders do the bidding of the Earthmen; when an Earthman says 'jump,' they jump!"

The crowd was growing angrier and angrier by the moment. Norvis saw black frowns, heard mutters of wrath. He saw it was his moment to spur them even further.

"They are trying to ruin our lives! You all know how things have changed in Nidor since they came; our old system is breaking down! A hundred years ago, no Elder would have ignored a proper petition from his Clan. I say we must destroy this evil by destroying the Earthmen! Their Bel-rogas School is a sacrilege against the name of our great ancestor!

"The Earthmen—"

He got no further. A clod of dirt

struck his chest, and he was astonished to hear someone shout, "Blasphemy!"

"Do you know who this Norvis peRahn is?" yelled someone else. "He's the blasphemer who was expelled from the School four years ago!"

"Stone him!" cried another. "False prophet!"

Norvis was paralyzed. He hadn't realized—

He snapped out of his shock when a rock thudded against his ribs, almost knocking the breath out of him.

Amid shouts of "Sacrilege!" and "Blasphemy!" and "Kill him!" Norvis peRahn Brajjyd turned to run. Another rock struck his back. The crowd, spurred on by a few of its more vociferous members, was beginning to get murderous.

"He preaches against the Great Light!"

"Stone him!"

Norvis leaped off the back edge of the platform, clearing the balustrade that ran along its rear edge. Twelve feet below him was the water of Shining Lake. As he hit the water, stones splashed all around him, thrown by some who had swarmed up on the stage to get at him.

"Get torches!"

"Bright lights!"

"Find the blasphemer!"

"Someone call the police! Call a priest!"

Norvis ducked underwater and swam as though his life depended

on it—which it did. There was only one way to go, directly across the lake. It was long and narrow, and he could make it across before anyone would be able to get around it. And he was fairly sure that no one would try to swim after him.

They didn't, but there were a few pleasure boats tied up near the shore, and some of the pursuers got into them, carrying torches raised over their heads to illuminate the water.

Norvis came up for breath and saw that he was far enough away from the boats to chance swimming on the surface. He headed for the opposite bank, hoping he'd come out of it alive.

When he reached the Grand Harbor of Vashcor a good many days later, after a tortuous and unpleasant hitch-hike with a foul-breathed old deest peddler who had been heading that way, he made his way almost immediately to the small, squat little hotel down in the fisherman's quarter of the city. He was in a dismal mood.

He registered under the peKrin Dmorno name and was shown to a dingy room overlooking the sea. His room was unpainted and smelled of fish, but it represented the first sanctuary for Norvis since his flight from Gelusar. He had barely managed to get out in one piece, after that stoning, and he was glad of a place where he could sit down and rest.

The outlook was gloomy. He had

botched things on all sides; Belrogas had been long ago lost to him, and his abortive crusade to prohibit use of the growth hormone had only resulted in his alienation from *both* sides; the people had stoned him as a blasphemer, and were now perfectly content to let the Elders squeeze them dry in the name of Scripture.

It was a bitter ending; now, he realized, he had accidentally pushed the Elders into a stronger position than they'd ever been in before. The populace was always ready to do something irrational if they could find theological grounds to do it on, and he had given grounds with his blasphemous talk. They still held firmly to the old beliefs, and they'd do so even if it ruined them—which it was doing.

He frowned and walked to the window. There was a cluster of boats in the harbor, and he squinted out, searching for the familiar mast of the *Baltbar*. He didn't see it, but his way seemed clear: he would abandon the pack of them, leave Nidor to its Elders, and throw in his lot with Del peFenn or some other free sea captain. It was an unheroic way out, but he was a miserable failure as a hero.

The next day, he made inquiries. No, the *Baltbar* was not in port, he was told; yes, it was due back soon, and have you heard about the blasphemer who was stoned in Gelusar?

Norvis pretended he hadn't, and was told the whole grisly tale. He

listened to it all patiently, and at the end said, "A grandson of the Elder Brajjyd, eh? What's that Clan coming to?"

"It's a disgrace, an utter disgrace," his informant agreed.

Norvis nodded. "But they killed the blasphemer?"

"Of course!"

"Well, then, we needn't worry," Norvis said. "His ideas stand no chance of being spread, then."

"A blessing indeed," the other said.

Norvis was overjoyed at the report of his death. It meant no one had seen him slip out at the far end of the Shining Lake and make his way out of Gelusar, and the knowledge of his death took some of the pressure off. He was free, now, to bury Norvis peRahn Brajjyd forever and live on in security as Norvis peKrin Dmorno.

Norvis strolled up and down the cobbled street that led past the quay, seeking the *Baltbar*. No one seemed quite sure where the ship was, but everyone seemed agreed that Captain Del peFenn would be back soon. Norvis hoped so; the quicker he got off land and away from the scene of his failure, the better.

At the end of the third day, he saw his first familiar face. Down at the end of a dock, busily cleaning scales from a newly-unloaded cargo of fish, was Ganz peKresh Danoy, the middle-aged swabhand from the *Baltbar*.

"How come you're here?" Norvis

asked. "You skip ship or something?"

The elderly ex-farmer was even more washed-out than he had looked aboard ship. He shook his head. "No," he said. "When the ship rolled, I became sick." He demonstrated this with a vivid gesture. "I am too old to learn how to stay aboard a ship."

"Sorry to hear that," Norvis said sympathetically. "What happened?"

"It was impossible for me to remain on the ship," Ganz peKresh said. "So Captain Del agreed to release me from my contract, pay me some money, and find me a job here on the docks. I am very grateful to him."

"Captain Del is a fine man," Norvis said. "I'm waiting for the *Balthar* to come back myself, right now."

"Oh?" the old man asked innocently. "Then your venture in Gelusar did not work out, eh?"

Norvis grinned. "I'm afraid not. I'm back here looking for a job."

"That is sad," Ganz peKresh said. "Tell me: how is it, in the peych regions? Are many of the farmers being . . . being driven out?"

"Unfortunately, yes," Norvis said. "And it'll get worse. The Elders have their own farms treated with this new Earthman substance, and they're turning out enough peych to fill the warehouses. The small men like you, who can't afford the new treatment, are being pushed out."

Ganz peKresh's faded face became even unhappier. "I can't understand how the Great Light will permit His Elders to do such a thing."

"I don't know either, Ganz peKresh," Norvis said. He pulled together his cloak. At this time of the year, the wind blew in from the sea, directly through the narrow, rock-bound channel. The combination of the sharp winds whipping in and the pungent odor of the fish Ganz peKresh was still busily cleaning was becoming a little too much for Norvis, and he decided he'd best move on.

"They are so wise," Ganz peKresh said reflectively. "They hold our world in their hands. They should see what they are doing."

"I guess there's no answer," Norvis said. "Not when the Elders are becoming so wealthy."

As Norvis turned to leave, Ganz peKresh smiled wistfully and said, "It is too bad the growth treatment may be given only to the few. How wonderful it would be if all the farmers could share in its bounty equally!"

"Yes," Norvis said politely, barely listening to what the old man had said. "Well, I must be moving on."

"May the Great Light bless you," Ganz peKresh said.

"May He illumine your mind," responded Norvis.

He had gone more than a hundred paces before he realized that

the old farmer had given him the answer.

The next two weeks he spent in his dingy hotel room, scribbling over page after page of calculations and formulae of the new mathematics he had learned at the Belrogas School, trying frantically to dig out of his memory the things he had striven so hard to forget for four years.

Fool! Why hadn't he seen it before? Of course, it simply wasn't done; it was unethical, dishonest, and a downright dirty trick. He grinned gleefully as he worked. Sure, it was a low blow, but as the Scriptures said: "Those who transgress the Law shall fall before other transgressors." That was justification enough.

Finally, after he had his notes all down and was absolutely sure they were correct, as sure as he could be without building a working model, he had one more problem to solve. He knew he could make the new hormone, but he had to make more of it, and faster. And, if possible, cheaper.

Now, let's see. What's the thing that makes the process so slow? He considered: it's got to be fermented in the vats, and then—

The Earthman, Smith, had taught him the trick of examining a problem closely to see where the solution lay. It was an Earthman kind of thinking. The first thing to do was to find out what the problem really was. "Get back to the basic

concept," Smith would say, over and over again.

Norvis hadn't tried to use the method in years, because he'd hated everything he'd learned at the School. But now he saw that that kind of thinking was necessary if he was going to beat a man who thought that way. Smith and Company were going to be tripped by their own feet.

When Captain Del peFenn Vyless strode down the gangplank of the *Baltbar*, he saw a familiar figure standing on the dock. His weathered face broke into a grin.

"Hoy! Norvis peKrin! By the Light, I *thought* you'd be back; once the sea gets into a man's blood, it's there to stay!" He shook the younger man's hand heartily. "What happened in Gelusar? I heard they stoned a man to death there for blasphemy. I hope you didn't get mixed up in it."

"No; I'm still alive. I saw what could happen to a man who tries to stir up trouble that way, so I decided on different tactics."

"Oh, so? Still trying to buck the Council?" The sea captain shook his head. "Give it up, my boy. That's like trying to dim the Great Light Himself."

Norvis shook his head. "I'm not giving up yet. I've got an idea, captain. I've got a little scheme that will make the Elders uncomfortable and make us some money at the same time. And it's perfectly legal. Do you want to hear it?"

"Won't do any harm to listen," Del peFenn said. "Come along to the Seaman's Guild Hall. I'll stand you to a drink."

"Right."

The public room at the Guild Hall was crowded with sailors who were relaxing after long voyages or bracing themselves for a new one. Norvis and the captain managed to get themselves a table, and after the drinks had been brought, the younger man began to outline his plan.

"You know of this new stuff, Grome, that's being used to make peych-beans grow better and mature faster? Well, I've got the formula for making it."

"But I thought some kid from the School had a monop—"

"Don't worry about that. Strictly legal, I tell you. I came by the formula honestly—believe me."

"I'll grant it," the captain said. "But reluctantly. Go ahead with the rest of the business."

"The way I see it, we'll make this Grome cheaper than the Gelusar plant is turning it out, and we'll sell it to the small farmers. That way, the big schemes of the Earthmen will bounce right back on them, and we'll keep the Elders from becoming too powerful. I think we can even drive the Gelusar manufacturer out of business if we can get a few men who'll keep our methods secret."

The captain looked highly skeptical. "I've got men on my ship I'd trust anywhere," he said. "But how

do you propose to do it? And what makes you think you got the right formula, anyway? And how can you produce more of it than the Gelusar people can?"

"I understand it took several of the Council Elders to put up enough money to build this one little plant. How can we build more than that? I don't have that kind of money, Norvis. Nor do you."

Norvis stilled the captain's rising flood of objections by raising his hand. "I'll prove to you that I know the formula by making some for you. We'll try it on some peych and see."

"As for building a producing plant, I've got a new idea there. A different way of doing things."

"How?" The captain seemed a little more interested now. His hard, keen eyes were wide open.

"The trouble is that the Gelusar plant is producing the stuff by making it in big lots, which ties up all their equipment for weeks at a time. They use what's called a batch process to turn it out. Now, if you can get the men on the ship to chip in with us—we'll promise each one his proper share—we can build the right kind of plant, one that'll produce the stuff in a steady stream."

Del peFenn leaned forward. "I don't quite see—"

Norvis pulled out a sheaf of paper covered with sketches in a large, scrawling hand. "See here: we make the process continuous instead of whipping up batches. Instead of making one big glob at a

time, we'll start the process at this end and feed in the various ingredients at different points along the line. Then we—"

When he was through explaining, Norvis looked at the captain. "Well, what do you say?"

Del peFenn scowled. "To be honest, I didn't understand a thing you were talking about. But it sounds as though you know what you're doing." He paused, while Norvis anxiously watched him chew the idea over in his mind. Finally he said, "What you want is a sort of regular contract. You supply the brains, and I supply the money. Fifty-fifty."

Norvis nodded.

"I'm sorry," the captain said. "I just can't risk—"

Norvis stopped him. "Now, wait a minute. You're the one who's taking the risk; I'll grant that. So I tell you what you do; you take control, too."

"What's that?"

"You see to the buying of equipment and everything. I'll just tell you what I want and how much I'll need. For my part of it, you can pay me a salary—whatever you think I'm worth. I trust you."

The captain chewed that over, too. Hesitating, he said, "Well-l-l . . . I don't know. It sounds good, but . . . well, how much would it take?"

Norvis named a figure that ran into the thousands of hundred-weights.

Captain Del winced and shook his head. "I don't know. Let me think about it a while."

It took Norvis better than a week to talk the sea officer into investing his money, but during that time he bought some small flasks and a few other things and ran off a batch of Grome right under the captain's nose. The process worked just as he had theoretically constructed it, back at Bel-rogas.

There was only a drop or two, but it was enough. Norvis bought two potted seedling peych plants and needled the stuff into the taproot of one.

"One thing we'll have to warn our customers about," Norvis warned, "is using too much of the hormone. They'll probably all overdose at first, but if they do, they'll not only waste it but probably ruin the plants."

"You've got this stuff figured pretty well," Del peFenn said. "I knew you were sharp, but I didn't think you were as good as that."

"Hold it," Norvis said. "Let's wait and see how sharp I am. We'll know soon enough."

When, within the space of a few days, the treated plant was noticeably different from its twin, Captain Del peFenn decided it was time to invest his money in the project.

Three months later, the first substantial yield from the new process came through from the factory. Nor-



vis and Del were confronted with the stuff early one morning, when Drosh peDrang Hebylla, the tall, thin young man who was the foreman of the hormone factory, came dashing up the end of the dock and hailed the nearby *Baltbar*.

"Here it is!" he cried enthusiastically, after the dinghy had conveyed him from shore to ship. He leaped out and held forth a small wooden box.

Norvis took it, lifted the lid, sniffed, and replaced the lid. "Ugh," he said. "It's not going to be its lovely odor that'll be the selling point, I'm afraid."

"You should come out and spend some time at the factory," Drosh peDrang said. "If you think this sample has a bad smell, you ought to hover around the end of our feed line for a while."

"That's all right," Del peFenn boomed. "There must be something in the Scripture some place about being able to put up with nasty smells for the sake of turning an honest few weights."

Norvis thought for a moment. "No," he said. "I can't think of any."

"Nor can I," said Drosh peDrang. "Nevertheless," the captain

maintained, "there must be something in there. There's something in that wonderful book to cover *everything!*"

"I wonder how the Elders are planning to hide their red faces when we get our stuff out to the common people," Norvis said.

"They're not going to like it much," replied Del. "But I think we've stepped on their toes so hard it's going to hurt a long time." He turned to Drosh peDrang. "You'll have the stuff ready to ship soon, won't you?"

"They're baling it now," the foreman told him.

"Good. The *Balthar*'s pulling out for Lidacor tomorrow, and we might as well start distributing it at once. The people up there are so hungry they'll hail us as saviors."

"Fine," said Norvis. "Lidacor's a good place to begin. Besides, it'll be pleasant to get away from the eternal fish-odor here in Vashcor, anyway. I like Lidacor."

"Oh, I forgot to tell you," Captain Del said. "You're not going with us, Norvis."

"How so?" Norvis asked, puzzled.

"You're heading in the other direction, taking a cargo of the stuff to Molcor and Sundacor—and Tammulcor as well, I guess. You'll be aboard the *Krand*."

"The *Krand*? That's Captain Prannt peDrel Kovnish's ship, isn't it?" Norvis asked.

"It was," Del corrected. "It's now Captain Norvis peKrin Dmorno's.

I entered your name in the Roll of Captains this morning. It's my new ship. I've decided to expand operations, now that there's the prospect of good business ahead. I'm now a two-ship man, and I couldn't think of a better captain for my new one than you, Norvis."

"I'm very grateful," Norvis said sincerely. He was tempted to add some blessing of the Great Light, but decided against it; it wouldn't be of much use in thanking Del, who didn't seem to set much store by the Scripture.

"You're sailing west tomorrow," Del told him. "We'll pull anchor at the same time. We ought to return rich men."

They did. The hungry farmers of Sugon swarmed all over the *Balthar* as soon as word traveled that a ship had arrived bearing the same wonderful mystery that had resulted in such marvelous production on the Elders' farms.

Del peFenn found people bidding frantically for the cargo, and one rich landowner offered to purchase the whole shipment for use on his farms. But Del remembered the careful plan of Norvis peKrin, which was to distribute the hormone as widely as possible, and he resolutely held the price down and rationed out the quantity. He returned to Vashcor with an empty hold and a full purse.

As for Norvis, his first experience as the captain of his own ship was an equally successful one.

He guided the *Krand* flawlessly around the coast, heading in a westerly direction toward the southwestern port of Sundacor, and at each of the three stops along the way he disbursed a third of his cargo.

Del peFenn had been back in Vashcor for several days when the *Krand* returned. As soon as his ship was docked and anchored, Norvis made his way to the *Baltbar*, but was told that the captain was at the hormone factory, located at the nearby town of Elvisen.

A swift deest ride took Norvis there. It was a tall and fairly imposing building, and he allowed himself the luxury of a sensation of pride at the sight of it.

He entered, and a busy-looking workman directed him up the stairs and around a corridor, where he opened a door and found Captain Del in conference with Foreman Drosh peDrang.

He sniffed as he entered. "Yes," he said. "This place *does* have a vile smell."

The two men, startled, looked around. "Norvis!"

"Hoy, Del!"

Hurriedly, they spilled out to each other the story of the success of their respective voyages.

"It's going well, is it?" Norvis said. "Good, good. We'll teach the Elders they can't corner a valuable commodity like Grome." He turned to Drosh peDrang.

"How are the local sales going?"

"We've established a center here

in Elvisen," he said. "The farmers have been coming from all over Pelvash to buy the stuff. The money's been coming in faster than we can get it to the bank."

"Hm-m-m. We don't want to get *too* rich out of this thing," Norvis said slyly. "Next thing we know the Elders will be coming to us looking for a loan."

"What's wrong with that?" Del asked.

"Looks bad in the public eye," explained Norvis. "The people are pretty much sold on the Elders, and we don't want to appear to be showing them up too badly. Remember what happened to that prophet fellow in Gelusar."

"The one they stoned? Well, they were right to stone him, I think," Del said. "What was he saying, after all? Wasn't it that the Grome should be abolished altogether?"

Norvis nodded uneasily. He was sure Del was unaware that *he* was that very prophet, but he wanted to make sure Del never found out. Norvis peRahn Brajjyd was better off where he was.

"Well," the captain said, "no wonder they stoned him. He was a false prophet to say the Grome should be abolished. That's an evil and stupid way of solving the problem. Give it to everyone! That's what he should have said."

"It didn't occur to him," Norvis said. "The poor devil! He didn't have enough brains to see the right way to handle the stuff, and that's why they stoned him."

"I don't know why you're so sympathetic," Del peFenn boomed. "After all, doesn't it say in the Scripture that a false prophet shall be stoned? Doesn't it? I think I'm right, this time."

"You are," Norvis said. "Seventh Section, as I recall."

Del was impressed. "You're quite the scholar, aren't you?" he asked.

"I've done a little reading," Norvis told him casually. To change the subject, he got up and walked to the window. The factory was located on a hill in North Elvisen, and there was a nice view of the rolling farmland of the province of Pelvash. He stood there a long time, staring out. The fields were bright with blossoms of the peych plants. It was easy to see that the hormone was in active use among the local farmers.

"They've got their fields all treated," he said.

"Yes," Drosh peDrang said. "Sales have been tremendous—just tremendous."

Norvis smiled. "It's going to surprise the Elders when that harvest starts coming up all over Nidor, isn't it? They're not going to like it at all."

"I think we've finally broken their stranglehold," Del said. "And we've given those Earthmen something to think about, too."

"I'll say," Norvis looked out at the spreading gray-green plains, the fertile hills with the tributaries of the Vash River wandering lazily among them. On every hill and

every valley, the golden blossoms of the peych shone, bright harbingers of the future.

It occurred to Norvis as he stood there that a couple of men had engaged in blunt rebellion against the Elders and the Earthmen and succeeded. For the first time, possibly, in the history of the planet, a man, an ordinary man, had taken the course of action into his own hands. And the Great Light still smiled upon him.

"Wait till those beans start coming up," Del peFenn said. "It's going to be a wonderful harvest."

"Yes," Norvis echoed. "A *wonderful* harvest." His ringing voice sounded a note of triumph.

FROM: Duncan H. MacLeod,
Observer, Sugon Province.

TO: Gordon P. Smith, Anthropological Division, Bel-rogas School.

I'm with you most of the way, Gordon. Brother! What this crop is going to do to Nidorian culture! But tell me—what does that have to do with young Norvis peRahn? Stuck out here in these accursed hills, I sometimes lose sight of the big picture. (That reminds me—tell Jones I want to get back to Bel-rogas soon; I'm tired of hiding here in Sugon.)

Everything *seems* to be working out fine. After all these years of work, we've finally succeeded in setting up the forces that will smash the Nidorian cultural matrix.

(That's the current phrase you Anthropology boys have been throwing around, isn't it?) We've ruined Nidor completely, though they don't know it yet. I suppose the Genetics Corps has something immediate in mind, but I can't quite follow it from here. The government, the religion, and the entire cultural system have been—or will be—completely demolished. But are the Genetics boys sure that young Brajjyd is the key man?

As far as this Province is concerned, they haven't felt the full impact of what we've done yet; the crops aren't much better than last season because the hormone hasn't been imported in too big a quantity as yet. With only one seaport, there hasn't been much chance for really good distribution; your tame fire-breather, Del peFenn, was through here with a shipload, but that's been it. Will this affect the situation as a whole? I hope not; the whole Nidor Project succeeds or fails at this point. (Unless, of course, Jones and his planners out there in the hills have reversed themselves—which is unlikely, but not inconceivable. I sometimes suspect that *I'm* being suckered out, as well as the Nidorians.)

I'd hate to think we'd miscalculated, though; the entire future of humanity is at stake on this insignificant little planet. I suppose I sound too dramatic, as usual, but I'm puzzled.

Hoping you are the same,
MacLeod

FROM: Gordon P. Smith, Anthropological Division, Bel-rogas School.

TO: Duncan H. MacLeod, Observer, Sugon Province.

Stop worrying. Genetics assures me that Norvis peRahn Brajjyd is the man. I've checked the whole thing through thoroughly with Jones, and the old man's given blanket approval of everything. According to Genetics, our entire eugenics program revolving around Bel-rogas has been definitely successful. We've bred, for once, a new type of Nidorian—even if he doesn't know it himself.

As for the future of the human race, no cause for worry there either. If a galaxy-wide culture such as ours can't succeed in blasting one little, insignificant medieval planet, and wrecking its culture to suit our tastes, we ought to give up.

Does that sound forceful enough?
Smith

FROM: Duncan H. MacLeod, Observer, Sugon Province.

TO: Gordon Smith, Anthropological Division, Bel-rogas School.

Sorry I didn't reply earlier, but things are starting to happen now that the crop is ripening. I'll give you the full report tomorrow, by full telefax.

Jones sent elaborate comments direct from the Mountains of the Morning hideout, and between his

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letter and yours I'm well aware of the whole situation.

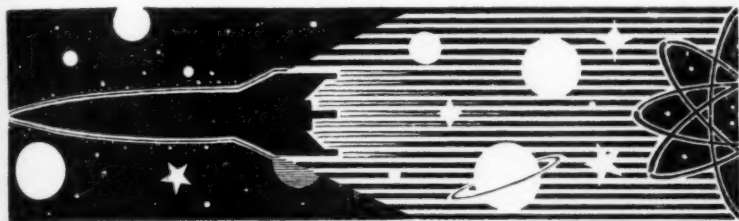
Agreed: we ought to be able to smash this culture to order. I think we've done it—though, as you say, the poor folk won't be able to see *why*, not for a while, at least. Jones put it to me this way: "The problem," he said, "is not to smash the culture—but to see that it gets put back together the right way."

I hope for everyone's sake that

Norvis peRahn knows what the right way is, because when that crop comes up all over things will start to crack. Norvis is the only factor in doubt. The only thing I can predict for sure is—boy, how they're going to hate us when they find out! It'll be a generation before they've seen what we've done—and six more before they can see why!

Cordially,
MacLeod.

THE END



ENGLISH TRANSLATION

The Three Laws of Thermodynamics, translated from Mathematics into English, come out:

1. You can't win.
2. You can't even break even.
3. Furthermore, you can't get out of the game!

However, Information Theory shows that Information is negative entropy; so the Three Laws of Infodynamics are:

1. You can win.
2. Furthermore, you can support a friend.
3. And you can quit the game when you're ahead!

Thanks to
Dr. Wayne Batteau,
Harvard Speculative Society.

2066: ELECTION DAY

There is a limit to any process you can name...and sooner or later that limit will be reached. Then... somehow you have to fumble together a new thing....

BY MICHAEL SHAARA

Illustrated by Freas

Early that afternoon Professor Larkin crossed the river into Washington, a thing he always did on Election Day, and sat for a long while in the Polls. It was still called the Polls, in this year 2066 A.D., although what went on inside bore no relation at all to the elections of primitive American history. The Polls was now a single enormous building which rose out of the green fields where the ancient Pentagon had once stood. There was only one of its kind in Washington, only one Polling Place in each of the forty-eight states, but since few visited the Polls nowadays, no more were needed.

In the lobby of the building, a great hall was reserved for visitors. Here you could sit and watch the many-colored lights dancing and flickering on the huge panels above, listen to the weird but strangely soothing hum and click of the vast central machine. Professor Larkin

chose a deep soft chair near the long line of booths and sat down. He sat for a long while smoking his pipe, watching the people go in and out of the booths with strained, anxious looks on their faces.

Professor Larkin was a lean, boyish-faced man in his late forties. With the pipe in his hand he looked much more serious and sedate than he normally felt, and it often bothered him that people were able to guess his profession almost instantly. He had a vague idea that it was not becoming to look like a college professor, and he often tried to change his appearance—a loud tie here, a sport coat there—but it never seemed to make any difference. He remained what he was, easily identifiable, Professor Harry L. (Lloyd) Larkin, Ph.D., Dean of the Political Science Department at a small but competent college just outside of Washington.

It was his interest in Political

Science which drew him regularly to the Polls at every election. Here he could sit and feel the flow of American history in the making, and recognize, as he did now, perennial candidates for the presidency. Smiling, he watched a little old lady dressed in pink, very tiny and very fussy, flit doggedly from booth to booth. Evidently her test marks had not been very good. She was clutching her papers tightly in a black-gloved hand, and there was a look of prim irritation on her face. But *she* knew how to run this country, by George, and one of these days *she* would be President. Harry Larkin chuckled.

But it did prove one thing. The great American dream was still intact. The tests were open to all. And anyone could still grow up to be President of the United States.

Sitting back in his chair, Harry Larkin remembered his own childhood, how the great battle had started. There were examinations for everything in those days—you could not get a job streetcleaning without taking a civil-service examination—but public office needed no qualifications at all. And first the psychologists, then the newspapers, had begun calling it a national disgrace. And, considering the caliber of some of the men who went into public office, it *was* a national disgrace. But then psychological testing came of age, really became an exact science, so that it was possible to test a man thoroughly—his knowledge, his potential, his per-



sonality. And from there it was a short but bitterly fought step to—SAM.

SAM. UNCLE SAM, as he had been called originally, the last and greatest of all electronic brains. Harry Larkin peered up in unabashed awe at the vast battery of lights which flickered above him. He knew that there was more to SAM than just this building, more than all the other forty-eight buildings put together, that SAM was actually an incredibly enormous network of electronic cells which had its heart in no one place, but its arms in all. It was an unbelievably complex analytical computer which judged a candidate far more harshly and thoroughly than the American public could ever have judged him. And crammed in its miles of memory banks lay almost every bit of knowledge mankind had yet discovered. It was frightening, many thought of it as a monster, but Harry Larkin was unworried.

The thirty years since the introduction of SAM had been thirty of America's happiest years. In a world torn by continual war and unrest, by dictators, puppet governments, the entire world had come to know and respect the American President for what he was: the best possible man for the job. And there was no doubt that he was the best. He had competed for the job in fair examination against the cream of the country. He had to be a truly remarkable man to come out on top.

The day was long since past when just any man could handle the presidency. A full century before men had begun dying in office, cut down in their prime by the enormous pressures of the job. And that was a hundred years ago. Now the job had become infinitely more complex, and even now President Creighton lay on his bed in the White House, recovering from a stroke, an old, old man after one term of office.

Harry Larkin shuddered to think what might have happened had America not adopted the system of "the best qualified man." All over the world this afternoon men waited for word from America, the calm and trustworthy words of the new President, for there had been no leader in America since President Creighton's stroke. His words would mean more to the people, embroiled as they were in another great crisis, than the words of their own leaders. The leaders of other countries fought for power, bought it, stole it, only rarely earned it. But the American President was known the world over for his honesty, his intelligence, his desire for peace. Had he not those qualities, "old UNCLE SAM" would never have elected him.

Eventually, the afternoon nearly over, Harry Larkin rose to leave. By this time the President was probably already elected. Tomorrow the world would return to peace. Harry Larkin paused in the door once before he left, listened to the reassur-

ing hum from the great machine. Then he went quietly home, walking quickly and briskly toward the most enormous fate on Earth.

"My name is Reddington. You know me?"

Harry Larkin smiled uncertainly into the phone.

"Why . . . yes, I believe so. You are, if I'm not mistaken, general director of the Bureau of Elections."

"Correct," the voice went on quickly, crackling in the receiver, "and you are supposed to be an authority on Political Science, right?"

"Supposed to be?" Larkin bridled. "Well, it's distinctly possible that I—"

"All right, all right," Reddington blurted. "No time for politeness. Listen, Larkin, this is a matter of urgent national security. There will be a car at your door—probably be there when you put this phone down. I want you to get into it and hop on over here. I can't explain further. I know your devotion to the country, if it wasn't for that I would not have called you. But don't ask questions. Just come. No time. Good-by."

There was a click. Harry Larkin stood holding the phone for a long shocked moment, then he heard a pounding at the door. The housekeeper was out, but he waited automatically before going to answer it. He didn't like to be rushed, and he was confused. Urgent national security? Now what in blazes—

The man at the door was an

Army major. He was accompanied by two young but very large sergeants. They identified Larkin, then escorted him politely but firmly down the steps into a staff car. Larkin could not help feeling abducted, and a completely characteristic rage began to rise in him. But he remembered what Reddington had said about national security and so sat back quietly with nothing more than an occasional grumble.

He was driven back into Washington. They took him downtown to a small but expensive apartment house he could neither identify nor remember, and escorted him briskly into an elevator. When they reached the suite upstairs they opened the door and let him in, but did not follow him. They turned and went quickly away.

Somewhat ruffled, Larkin stood for a long moment in the hall by the hat table, regarding a large rubber plant. There was a long sliding door before him, closed, but he could hear an argument going on behind it. He heard the word "SAM" mentioned many times, and once he heard a clear sentence: "... Government by machine. I will not tolerate it!" Before he had time to hear any more, the doors slid back. A small, square man with graying hair came out to meet him. He recognized the man instantly as Reddington.

"Larkin," the small man said, "glad you're here." The tension on his face showed also in his voice. "That makes all of us. Come in

and sit down." He turned back into the large living room. Larkin followed.

"Sorry to be so abrupt," Reddington said, "but it was necessary. You will see. Here, let me introduce you around."

Larkin stopped in involuntary awe. He was used to the sight of important men, but not so many at one time, and never so close. There was Secretary Kell, of Agriculture, Wachsmuth, of Commerce, General Vines, Chief of Staff, and a battery of others so imposing that Larkin found his mouth hanging embarrassingly open. He closed it immediately.

Reddington introduced him. The men nodded one by one, but they were all deathly serious, their faces drawn, and there was now no conversation. Reddington waved him to a chair. Most of the others were standing, but Larkin sat.

Reddington sat directly facing him. There was a long moment of silence during which Larkin realized that he was being searchingly examined. He flushed, but sat calmly with his hands folded in his lap. After a while Reddington took a deep breath.

"Dr. Larkin," he said slowly, "what I am about to say to you will die with you. There must be no question of that. We cannot afford to have any word of this meeting, any word at all, reach anyone not in this room. This includes your immediate relatives, your friends, anyone—anyone at all. Be-

fore we continue, let me impress you with that fact. This is a matter of the gravest national security. Will you keep what is said here in confidence?"

"If the national interests—" Larkin began, then he said abruptly, "of course."

Reddington smiled slightly.

"Good. I believe you. I might add that just the fact of your being here, Doctor, means that you have already passed the point of no return . . . well, no matter. There is no time. I'll get to the point."

He stopped, looking around the room. Some of the other men were standing and now began to move in closer. Larkin felt increasingly nervous, but the magnitude of the event was too great for him to feel any worry. He gazed intently at Reddington.

"The Polls close tonight at eight o'clock." Reddington glanced at his watch. "It is now six-eighteen. I must be brief. Doctor, do you remember the prime directive that we gave to SAM when he was first built?"

"I think so," said Larkin slowly.

"Good. You remember then that there was one main order. SAM was directed to elect, quote, *the best qualified man*. Unquote. Regardless of any and all circumstances, religion, race, so on. The orders were clear—the best qualified man. The phrase has become world famous. But unfortunately"—he glanced up briefly at the men surrounding

him—"the order was a mistake. Just whose mistake does not matter. I think perhaps the fault lies with all of us, but—it doesn't matter. What matters is this: SAM will not elect a president."

Larkin struggled to understand. Reddington leaned forward in his chair.

"Now follow me closely. We learned this only late this afternoon. We are always aware, as you no doubt know, of the relatively few people in this country who have a chance for the presidency. We know not only because they are studying for it, but because such men as these are marked from their childhood to be outstanding. We keep close watch on them, even to assigning the Secret Service to protect them from possible harm. There are only a very few. During this last election we could not find more than fifty. All of those people took the tests this morning. None of them passed."

He paused, waiting for Larkin's reaction. Larkin made no move.

"You begin to see what I'm getting at? *There is no qualified man.*"

Larkin's eyes widened. He sat bolt upright.

"Now it hits you. If none of those people this morning passed, there is no chance at all for any of the others tonight. What is left now is simply crackpots and malcontents. They are privileged to take the tests, but it means nothing. SAM is not going to select anybody. Because sometime during the last four years

the presidency passed the final limit, the ultimate end of man's capabilities, and with scientific certainty we know that there is probably no man alive who is, according to SAM's directive, qualified."

"But," Larkin interrupted, "I'm not quite sure I follow. Doesn't the phrase 'elect the best qualified man' mean that we can at least take the best we've got?"

Reddington smiled wanly and shook his head.

"No. And that was our mistake. It was quite probably a psychological block, but none of us ever considered the possibility of the job surpassing human ability. Not then, thirty years ago. And we also never seemed to remember that SAM is, after all, only a machine. He takes the words to mean exactly what they say: Elect the best, comma, *qualified*, comma, man. But do you see, if there is *no* qualified man, SAM cannot possibly elect the best. So SAM will elect no one at all. Tomorrow this country will be without a president. And the result of that, more than likely, will mean a general war."

Larkin understood. He sat frozen in his chair.

"So you see our position," Reddington went on wearily. "There's nothing we can do. Re-electing President Creighton is out of the question. His stroke was permanent, he may not last the week. And there is no possibility of tampering with SAM, to change the directive. Because, as you know, SAM is fool-

proof, had to be. The circuits extend through all forty-eight states. To alter the machine at all requires clearing through all forty-eight entrances. We can't do that. For one thing, we haven't time. For another, we can't risk letting the world know there is no qualified man.

"For a while this afternoon, you can understand, we were stumped. What could we do? There was only one answer, we may come back to it yet. Give the presidency itself to SAM—"

A man from across the room, whom Larkin did not recognize, broke in angrily.

"Now Reddington, I told you, that is government by machine! And I will not stand—"

"What else can you *do*!" Reddington whirled, his eyes flashing, his tension exploding now into rage. "Who else knows all the answers? Who else can compute in two seconds the tax rate for Mississippi, the parity levels for wheat, the probable odds on a military engagement? Who else but SAM! And why didn't we do it long ago, just feed the problems to *him*, SAM, and not go on killing man after man, great men, *decent* men like poor Jim Creighton, who's on his back now and dying because people like you—" He broke off suddenly and bowed his head. The room was still. No one looked at Reddington. After a moment he shook his head. His voice, when he spoke, was husky.

"Gentlemen, I'm sorry. This

leads nowhere." He turned back to Larkin.

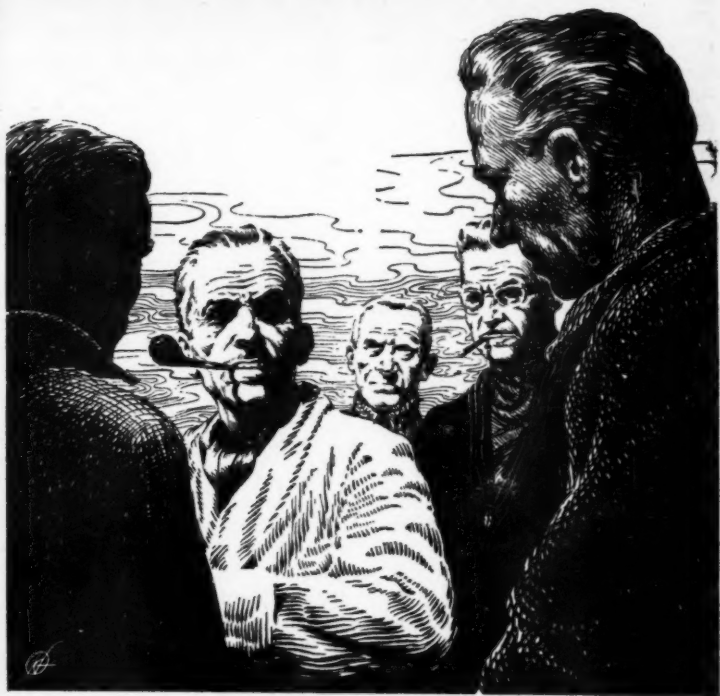
Larkin had begun to feel the pressure. But the presence of these men, of Reddington's obvious profound sincerity, reassured him. Creighton had been a great president, he had surrounded himself with some of the finest men in the country. Larkin felt a surge of hope that such men as these were available for one of the most critical hours in American history. For critical it was, and Larkin knew as clearly as anyone there what the absence of a president in the morning—no deep reassurance, no words of hope—would mean. He sat waiting for Reddington to continue.

"Well, we have a plan. It may work, it may not. We may all be shot. But this is where you come in. I hope for all our sakes you're up to it."

Larkin waited.

"The plan," Reddington went on, slowly, carefully, "is this. SAM has one defect. We can't tamper with it. But we *can* fool it. Because when the brain tests a man, it does not at the same time identify him. We do the identifying ourselves. So if a man named Joe Smith takes the personality tests and another man also named Joe Smith takes the Political Science tests, the machine has no way of telling them apart. Unless our guards supply the difference SAM will mark up the results of both tests to one Joe Smith. We can clear the guards, no problem

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there. The first problem was to find the eight men to take the eight tests."

Larkin understood. He nodded.

"Exactly. Eight specialists," Reddington said. "General Vines will take the Military; Burden, Psychology; Wachsmuth, Economics; and so on. You, of course, will take the Political Science. We can only hope that each man will come out with a high enough score in his own field so that the combined scores of our

mythical 'candidate' will be enough to qualify him. Do you follow me?"

Larkin nodded dazedly. "I think so. But—"

"It should work. It has to work."

"Yes," Larkin murmured, "I can see that. But who, who will actually wind up—"

"As president?" Reddington smiled very slightly and stood up.

"That was the most difficult question of all. At first we thought there

was no solution. Because a president must be so many things—consider. A president blossoms instantaneously, from nonentity, into the most important job on earth. Every magazine, every newspaper in the country immediately goes to work on his background, digs out his life story, anecdotes, sayings, and so on. Even a very strong fraud would never survive it. So the first problem was believability. The new president must be absolutely believable. He must be a man of obvious character, of obvious intelligence, but more than that, his former life must fit the facts: he must have had both the time and the personality to prepare himself for the office.

"And you see immediately what all that means. Most businessmen are out. Their lives have been too social, they wouldn't have had the time. For the same reason all government and military personnel are also out, and we need hardly say that anyone from the Bureau of Elections would be immediately suspect. No. You see the problem. For a while we thought that the time was too short, the risk too great. But then the only solution, the only possible chance, finally occurred to us.

"The only believable person would be—a professor. Someone whose life has been serious but unhurried, devoted to learning but at the same time isolated. The only really believable person. And not a scientist, you understand, for a man like that would be much too overbalanced in one direction for our

purpose. No, simply a professor, preferably in a field like Political Science, a man whose sole job for many years has been teaching, who can claim to have studied in his spare time, his summers—never really expected to pass the tests and all that, a humble man, you see—"

"Political Science," Larkin said.

Reddington watched him. The other men began to close in on him.

"Yes," Reddington said gently. "Now do you see? It is our only hope. Your name was suggested by several sources, you are young enough, your reputation is well known. We think that you would be believable. And now that I've seen you"—he looked around slowly—"I for one am willing to risk it. Gentlemen, what do you say?"

Larkin, speechless, sat listening in mounting shock while the men agreed solemnly, one by one. In the enormity of the moment he could not think at all. Dimly, he heard Reddington.

"I know. But, Doctor, there is no time. The Polls close at eight. It is now almost seven."

Larkin closed his eyes and rested his head on his hands. Above him Reddington went on inevitably.

"All right. You are thinking of what happens after. Even if we pull this off and you are accepted without question, what then? Well, it will simply be the old system all over again. You will be at least no worse off than presidents before SAM. Better even, because if worst comes to worst there is always

SAM. You can feed all the bad ones to him. You will have the advice of the cabinet, of the military staff. We will help you in every way we can, some of us will sit with you on all conferences. And you know more about this than most of us, you have studied government all your life.

"But all this, what comes later is not important. Not now. If we can get through tomorrow, the next few days, all the rest will work itself out. Eventually we can get around to altering SAM. But we must have a president in the morning. You are our only hope. You can do it. We all know you can do it. At any rate there is no other way, no time. Doctor," he reached out and laid his hand on Larkin's shoulder, "shall we go to the Polls?"

It passed, as most great moments in a man's life do, with Larkin not fully understanding what was happening to him. Later he would look back to this night and realize the enormity of the decision he had made, the doubts, the sleeplessness, the responsibility and agony toward which he moved. But in that moment he thought nothing at all. Except that it was Larkin's country, Larkin's America. And Reddington was right. There was nothing else to do. He stood up.

They went to the Polls.

At 9:30 that evening, sitting alone with Reddington back at the apartment, Larkin looked at the face of the announcer on the television

screen, and heard himself pronounced President-elect of the United States.

Reddington wilted in front of the screen. For a while neither man moved. They had come home alone, just as they had gone into the Polls one by one in the hope of arousing no comment. Now they sat in silence until Reddington turned off the set. He stood up and straightened his shoulders before turning to Larkin. He stretched out his hand.

"Well, may God help us," he breathed, "we did it."

Larkin took his hand. He felt suddenly weak. He sat down again, but already he could hear the phone ringing in the outer hall. Reddington smiled.

"Only a few of my closest friends are supposed to know about that phone. But every time anything big comes up—" He shrugged. "Well," he said, still smiling, "let's see how it works."

He picked up the phone and with it an entirely different manner. He became amazingly light and cheerful, as if he was feeling nothing more than the normal political good will.

"Know him? Of course I know him. Had my eye on the guy for months. Really nice guy, wait'll you meet him... yup, college professor, Political Science, written a couple of books... must know a hell of a lot more than Polly Sci, though. Probably been knocking himself out in his spare time. But those teach-

ers, you know how it is, they don't get any pay, but all the spare time in the world... Married? No, not that I know of—"

Larkin noticed with wry admiration how carefully Reddington had slipped in that bit about spare time, without seeming to be making an explanation. He thought wearily to himself I hope that I don't have to do any talking myself. I'll have to do a lot of listening before I can chance any talking.

In a few moments Reddington put down the phone and came back. He had on his hat and coat.

"Had to answer a few," he said briefly, "make it seem natural. But you better get dressed."

"Dressed? Why?"

"Have you forgotten?" Reddington smiled patiently. "You're due at the White House. The Secret Service is already tearing the town apart looking for you. We were supposed to alert them. Oh, by the saints, I hope that wasn't too bad a slip."

He pursed his mouth worriedly while Larkin, still dazed, got into his coat. It was beginning now. It had already begun. He was tired but it did not matter. That he was tired would probably never matter again. He took a deep breath. Like Reddington, he straightened his shoulders.

The Secret Service picked them up halfway across town. That they knew where he was, who he was, amazed him and worried Reddington. They went through the gates of the White House and drove up

before the door. It was opened for him as he put out his hand, he stepped back in a reflex action, from the sudden blinding flares of the photographer's flashbulbs. Reddington behind him took him firmly by the arm. Larkin went with him gratefully, unable to see, unable to hear anything but the roar of the crowd from behind the gates and the shouted questions of the reporters.

Inside the great front doors it was suddenly peaceful again, very quiet and pleasantly dark. He took off his hat instinctively. Luckily he had been here before, he recognized the lovely hall and felt not awed but at home. He was introduced quickly to several people whose names made no impression on him. A woman smiled. He made an effort to smile back. Reddington took him by the arm again and led him away. There were people all around him, but they were quiet and hung back. He saw the respect on their faces. It sobered him, quickened his mind.

"The president's in the Lincoln Room," Reddington whispered. "He wants to see you. How do you feel?"

"All right."

"Listen."

"Yes."

"You'll be fine. You're doing beautifully. Keep just that look on your face."

"I'm not trying to keep it there."

"You aren't?" Reddington looked at him. "Good. Very good." He

paused and looked again at Larkin. Then he smiled.

"It's done it. I thought it would but I wasn't sure. But it does it every time. A man comes in here, no matter what he was before, no matter what he is when he goes out, but he feels it. Don't you feel it?"

"Yes. It's like—"

"What?"

"It's like . . . when you're in here . . . you're *responsible*."

Reddington said nothing. But Larkin felt a warm pressure on his arm.

They paused at the door of the Lincoln Room. Two Secret Service men, standing by the door, opened it respectfully. They went on in, leaving the others outside.

Larkin looked across the room to the great, immortal bed. He felt suddenly very small, very tender. He crossed the soft carpet and looked down at the old man.

"Hi," the old man said. Larkin was startled, but he looked down at the broad weakly smiling face, saw the famous white hair and the still-twinkling eyes, and found himself smiling in return.

"Mr. President," Larkin said.

"I hear your name is Larkin." The old man's voice was surprisingly strong, but as he spoke now Larkin could see that the left side of his face was paralyzed. "Good name for a president. Indicates a certain sense of humor. Need a sense of humor. Reddington, how'd it go?"

"Good as can be expected, sir."

He glanced briefly at Larkin. "The president knows. Wouldn't have done it without his O.K. Now that I think of it, it was probably he who put the Secret Service on us."

"You're doggone right," the old man said. "They may bother the by-jingo out of you, but those boys are necessary. And also, if I hadn't let them know we knew Larkin was material—" He stopped abruptly and closed his eyes, took a deep breath. After a moment he said: "Mr. Larkin?"

"Yes, sir."

"I have one or two comments. You mind?"

"Of course not, sir."

"I couldn't solve it. I just . . . didn't have time. There were so many other things to do." He stopped and again closed his eyes. "But it will be up to you, son. The presidency . . . must be preserved. What they'll start telling you now is that there's only one way out, let SAM handle it. Reddington, too," the old man opened his eyes and gazed sadly at Reddington, "he'll tell you the same thing, but don't you believe it.

"Sure, SAM knows all the answers. Ask him a question on anything, on levels of parity tax rates, on anything. And right quick SAM will compute you out an answer. So that's what they'll try to do, they'll tell you to take it easy and let SAM do it.

"Well, all right, up to a certain point. But Mr. Larkin, understand this. SAM is like a book. Like a book, he knows the answers. *But*

only those answers we've already found out. We gave SAM those answers. A machine is not creative, neither is a book. Both are only the product of creative minds. Sure, SAM could hold the country together. But growth, man, there'd be no more growth! No new ideas, new solutions, change, progress, development! And America *must* grow, must progress—"

He stopped, exhausted. Reddington bowed his head. Larkin remained idly calm. He felt a remarkable clarity in his head.

"But, Mr. President," he said slowly, "if the office is too much for one man, then all we can do is cut down on his powers—"

"Ah," the old man said faintly, "there's the rub. Cut down on what? If I sign a tax bill, I must know enough about taxes to be certain that the bill is the right one. If I endorse a police action, I must be certain that the strategy involved is militarily sound. If I consider farm prices . . . you see, you see, what will you cut? The office is responsible for its acts. It must remain responsible. You cannot take just someone else's word for things like that, you must make your own decisions. Already we sign things we know nothing about, bills for this, bills for that, on somebody's word."

"What do you suggest?"

"The old man cocked an eye toward Larkin, smiled once more with half his mouth, anciently worn, only hours from death, an old, old man

with his work not done, never to be done.

"Son, come here. Take my hand. Can't lift it myself."

Larkin came forward, knelt by the side of the bed. He took the cold hand, now gaunt and almost translucent, and held it gently.

"Mr. Larkin," the president said. "God be with you, boy. Do what you can. Delegate authority. Maybe cut the term in half. But keep us human, please, keep us growing, keep us alive." His voice faltered, his eyes closed. "I'm very tired. God be with you."

Larkin laid the hand gently on the bed cover. He stood for a long moment looking down. Then he turned with Reddington and left the room.

Outside he waited until they were past the Secret Service men and then turned to Reddington.

"Your plans for SAM. What do you think now?"

Reddington winced.

"I couldn't see any way out."

"But what about now? I have to know."

"I don't know. I really don't know. But . . . let me tell you something."

"Yes."

"Whatever I say to you from now on is only advice. You don't have to take it. Because understand this: however you came in here tonight you're going out the president. You were elected. Not by the people maybe, not even by SAM. But you're

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president by the grace of God and that's enough for me. From this moment on you'll be president to everybody in the world. We've all agreed. Never think that you're only a fraud, because you aren't. You heard what the president said. You take it from here."

Larkin looked at him for a long while. Then he nodded once briefly.

"All right," he said.

"One more thing."

"Yes?"

"I've got to say this. Tonight, this afternoon, I didn't really know what I was doing to you. I thought . . . well . . . the crisis came. But you had no time to think. That wasn't right. A man shouldn't be pushed into a thing like this without time to think. The old man just taught me something about making your own decisions. I should have let you make yours."

"It's all right."

"No, it isn't. You remember him in there. Well. That's you four years

from tonight. If you live that long."

Now it was Larkin who reached out and patted Reddington on the shoulder.

"That's all right, too," he said.

Reddington said nothing. When he spoke again Larkin realized he was moved.

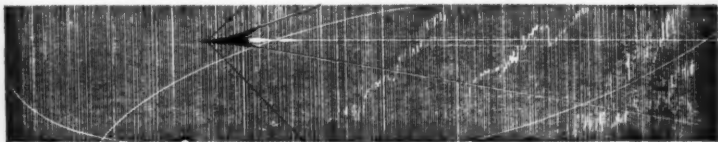
"We have the greatest luck, this country," he said tightly. "At all the worst times we always seem to find all the best people."

"Well," Larkin said hurriedly, "we'd better get to work. There's a speech due in the morning. And the problem of SAM. And . . . oh, I've got to be sworn in."

He turned and went off down the hall. Reddington paused a moment before following him. He was thinking that he could be watching the last human President the United States would ever have. But —once more he straightened his shoulders.

"Yes, sir," he said softly, "Mr. President."

THE END





LOOK ON MY WORKS

Pride in accomplishment is many times unjustly demeaned; it's a proper and necessary thing . . . when the proud one has earned it himself by his own works. . . .

BY ALGIS BUDRYS

Illustrated by Freas

We came upon the spaceship in an entirely natural way.

In February, it was then very pleasant on the bay. The last ice was gone out to sea long ago, the air was not cold, not hot, and the winter rains had done much to wash the buildings clean. When the sun shone, one could see very far over the side of the rowing boat, to the mossy streets where the New Yorkers used to walk. In truth, it is undoubtedly still so, but I never go there any more.

My former colleague Zhosef and I would often go boating at such times, early in the morning of one

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of our free days. It was a leisurely drift down the river from Yonkers, and one was among the buildings very shortly. There were some gulls, but they were not nesting yet. So, in those days, Zhosef and I would thus take our recreation, sometimes rowing between the taller buildings that rose above the waters, sometimes simply drifting and occasionally sipping some of the wine they make so well a little farther up the valley.

It was a relaxing manner of spending a day. One might contemplate, observing crumbled mortar or the rill of water in the dead eye-sockets of the buildings, that the men of those days were not so smart after all. Also, now and then one caught a fish. Further, it permitted of solitude, and one with a family comes to appreciate this.

It was at such times that Zhosef, who was then my friend and colleague, was apt to let the wine put him in a mood. He would sometimes turn to me and express a viewpoint rather individually his:

"Charles, my colleague," —I should explain, perhaps, that Zhosef and myself were in those days of equal status in the Ministry of the Interior—"we are surrounded with the grandeur of Man. And what do we do? We drift through its shadows in a rowboat!" This he expressed with some vehemence.

"Ah, Zho, you are a hopeless romantic," was my usual reply. "You are impressed by sheer physical size. Your brain is staggered at the

thought of how much effort was required to raise these towers. You forget that tremendous effort is the usual result of an inability to think out a simpler solution to a problem. You dote on the Great Wall of China, forgetting that a few strands of barbed wire constitute a far more effective barrier. You speak of grandeur—you are worshipping colossal stupidity. Was it not these very people's ignorance of climatology that permitted the icecaps to melt and the seacoasts to be drowned?"

Indignantly, Zhosef would shift his tack. "And are we, then, conducting research which will teach us how to avoid such disasters in the future?"

"The sea can hardly advance any farther. Some day it will recede again, and the problem of its next rise can safely be left to the people of those times. We have work enough for all with our own concerns—or would you prefer to abandon the difficulties of the food supply? Would you prefer to starve to death among your books in some ivory tower?"

This type of rejoinder always nettled Zhosef. I had learned that Zhosef's father was a professor of some kind. It was always Zhosef's secret sorrow that a professor's salary was inadequate to afford his children a higher education.

Poor Zhosef! Not a practical man at all. Still, he was sometimes capable of rising above himself—However, we shall come to that.

In any case, these little exchanges were never very extensive. It is in the nature of wine to make a brief mood, and then pass on.

It was very fortifying to drift about, seeing the city as the New Yorkers never saw it. To them, it must have been a city of canyons. But now they are dead and gone, and to myself, drifting serene high above their streets, it was a city of roofs. I saw it as they had never seen it. Surely, they never knew of the richness of the ornamented cornices far above their heads—the gargoyles and griffins that had brooded over them in such profusion and whose feet were now lapped by salted water. Only the gargoyles shared my secret vantage, and frequently as the boat passed among them, we exchanged knowing smiles, the ancient gargoyles and I.

At any rate, it was on such a day—and, importantly, soon after such a conversation—we saw the small spacecraft coming down. It hovered far above our heads, and then it sank down until it rested on a roof that was several squares away from Zhosef and myself. It made a quite horrible amount of noise, and was otherwise bare and blunt, but then, it was perfectly representative of the people it harbored.

I was, of course, greatly excited. Zhosef was frightened, and suggested we row quickly away and inform the authorities. With some difficulty, I dissuaded him:

"Have some sense, Zho. If we

inform the authorities, who but they will receive credit for this discovery? You and I will be pushed aside and warned to be silent about what will immediately become a State secret. What good for us is there in that?"

"But, Charles, we are not qualified—"

"*Pish!* Are the authorities qualified? No. You and I will investigate this, Zho."

So, after this little talk, we rowed toward the roof where the spaceship had landed, and clambered up. Fortunately, the roof was almost flush with the water.

As I had expected, our appearance brought about a response from the ship. A round door—I am sure there is a more precise word, but I can hardly be expected to trouble myself with mechanics' jargon—a round door, as I said, opened in its side, and a ladder clattered down to rest on the roof. A man with oddly cut clothes and, of all crudities, a beard, climbed down the ladder carrying a large black box by its handle.

Zho had stopped a moment before I did, and was consequently behind me. It devolved on me to make some greeting:

"A thousand welcomes," I said. "I greet you in the name of The Mid-Eastern State!"

The man, who, apart from his baggy trousers and his beard, might have passed for someone civilized, replied in a harshly accented, short-

sentenced language I was at a complete loss to understand. At the same time, he arrayed his features into a naive, open smile that made him look positively foolish. And he opened the lid of his box.

I noticed a rather heavy cable running back from it and into the ship. Zhosef grew quite restive behind me, but I managed to step back and press his toes with my heel. I admit there was a possibility in my mind that the hairy creature might intend hostility, but I reasoned that nothing requiring so much preliminary fumbling could possibly be a weapon.

Nor was it. After toying with his apparatus for an interminable time, the barbarian at last straightened up and began making crude gestures interspersed with further snatches of his really vulgar-sounding and excessively loud-voiced language. I gathered—quite some time before he gave me credit for doing so—that he wished me to continue speaking. I did:

"A thousand welcomes," I repeated. "We greet you in the name of the State. Accept the hospitality of our people and be assured of our undying friendship." After all, one must say *something*. "My name is Shales Zhonson. This is my colleague, Zhosef Broun. Our joy at this honor is unbounded, and we are gratified that you have chosen to make the arduous journey to our land in your own august person, when someone of lesser stature might have been sent. If there is

anything in our poor power to do for you, please be certain that you have only to ask."

It is the same speech one makes to Canadian and Southron ambassadors. If it is good enough for the Minister to make, is it not good enough for me? In any case it served the purpose, for after some minutes of this in the same vein, the box replied, with astonishing fluidity and true polish:

"A thousand thanks. Please be assured of our undying friendship, and of our gratification at the privilege of visiting your fair and sovereign nation."

This much the machine did for itself, and quite impressively. For a moment, my estimate of the man wavered before the good impression made by the couth of the reply. But the man now picked up a microphone and began speaking into it, with the machine endeavoring to translate for him. The result was rather distressing:

"My name's Tom Gormun. You'll have to excuse the translator—I can't make heads or tails out of that accent of yours. I guess six hundred years kind of pile it up. Anyway—I'm off the colony that got shipped out to Centaurus. Say, this *is* New York, ain't it?"

The poor machine obviously faltered along, trying to reduce his vulgarities to something like polished conversation. I was reminded of the story concerning the ape and the diamond tiara.

But—enough of this. You per-

ceive my first impressions of this barbarian from the Centaurian colony. You may be assured they have not altered in the slightest during the years since that first meeting. We continued to speak for about an hour, allowing the machine to sort out the linguistic drift that had occurred among the colonists since they were dispatched, about seventy years before the city was flooded. In due course, it learned to correct the barbarian's mistakes, but it could not, of course, translate what was not there. One may take a barbarian into one's culture, but one cannot put culture into a barbarian.

Zhosef did not, at first, enter into the conversation at all. I was just as pleased. He might have consumed valuable time, and I knew the authorities must have gotten a report by now, from some other observer. Eventually, a boat must come down the river to investigate. I did not, at the time, realize how invaluable Zhosef would be as a companion in this venture. So I was quite glad when the Centaurian concluded we could now speak with ease, and proposed that Zhosef and I show him the city.

"Never seen anything like it," he kept muttering as he looked about him. "Never. Heard about it, but that ain't the same by a long shot. The place's tremendous! That true, about there being millions of people living here in one big pile?"

"About eight or nine million." I would have shrugged—but it was

at this point that I bethought myself of Zhosef's moods, and a vagrant thought came to me therefrom. I began to foresee a certain advantage in not displaying any sort of nonchalance in any connection with the waterlogged ruins.

"And how long ago'd it flood?"

"About five hundred years."

"And some of it's still standing—Space! They must of been some engineers."

"We couldn't possibly do as well today."

"I guess not," he muttered, forgetting he was holding the translation microphone near his mouth, and looking over toward the side of the roof where our boat was tied up. Obviously he had seen it was a simple wooden skiff, and drawn his conclusions from that. Well, he was quite correct.

And at this supremely inspired moment, Zhosef put in: "It would be utterly impossible for us. We have not the resources or the energy. It is sometimes all we can do to struggle after food. We draw in tighter every year—farther than the sea ever pushed us."

You understand me—I am not a creature of volatile temperament. But I had an impulse to hug poor, simple-hearted Zho with his half-liter of wine in his stomach. Suddenly I had realized that, though I was not yet assured of my next steps, for as much of an idea as I had, Zhosef could not have done better if I had rehearsed him. The Centaurian—Gormun—looked at us

with sudden pity in his eyes, and I smiled withinwardly.

And, still smiling, I courteously permitted Gormun to precede me into the boat, and then sat down beside him while Zhosef busied himself with the oars. For all his sedentary life, my colleague had inherited broad shoulders from some ancestor or another.

So, we set out on our voyage of exploration. The barbarian had pulled a small auxiliary device out of the translation machine. This was another clever little construction, with an extensible antenna which presumably drew power from the larger machine as well as maintaining communication with it. Ingenious.

So, as I was saying— We set out, Zhosef rowing and the colonial and I weighing down the stern. The barbarian's head was continually turning from side to side as he goggled at the buildings sliding by, and on his face was an egregiously childlike look of awe and moon-struck sentimentality.

"It's like comin' into a giant's graveyard," he muttered, shaking his head. "Seeing big white bones just lying there, taller'n you are—so big you can't figure anything could kill 'em." He looked over the side, shaking his head again. "New York—the biggest thing anybody ever built. How deep is it?"

"Eighty meters or so."

He frowned over that. "No good

—don't use those units no more. Try it in man-heights."

"Forty."

He looked around at the stubs and spires crowding up out of the water on all sides. Rather like an overused hairbrush lying on its back in a shallow basin of scummy water, I would say. But then, I have moments when poetry deserts my soul utterly.

"How far's it go on?"

"For kilometers." Arbitrary units do not translate, of course, but he received the proper impression.

"And there ain't *nothing* living here any more?"

"What could?" I asked, reasonably enough.

"The birds," Zhosef offered.

Well, yes, the birds. As you know, at certain seasons of the year—not early spring, fortunately—it is quite impossible to drift tranquilly about the city.

"A lot of birds?" the barbarian asked.

"Millions," Zhosef answered.

The colonial shook his head again. (He was *continually* shaking his head. That and his constant exclamations of awe were driving me to distraction as rapidly as they also warmed my heart. But you have no doubt experienced the ambivalent phenomenon for yourself.) "This whole thing—this great big city—this place we all remember—turned into a squatting place for birds!" he said in a hoarse voice.

"Oh, yes," Zhosef said. "They are an important source of food

and fertilizer." He nodded as he rowed. "We're fortunate in having such a concentration of them nearby—quite fortunate. And of course, none of us care what happens to the city any more." His voice was thick with bitterness.

At times—at most times—Zhosef was quite as practical as you and I, really. It was only when the wine—but, you know wine. And I was never quite as glad for it as I was that morning. He was being magnificent. No rehearsal—no coaching—could possibly have brought Zhosef to such a high point of usefulness as could a half-liter of fermented sentiment. About New York he waxed poetic, and about our poor present-day existence, he waned into practicality. You must understand that at this time I had only an inkling—the barest, first beginning—of the course to be pursued in relation to the Centaurian. But Zhosef, with the instinct of some nobler being, was in his own way anticipating every need before it became apparent. Did he know what he was doing? Of course not! He was only being himself. But, before such divine inspiration a poor mere fitter-together of reasoning, pursuing his methodical ways, must bow his head in admiration.

But, to return to our account. When we passed quite close by a row of empty windows that rose half out of the water, the barbarian came near to overturning the boat as he leaned to look inside.

"Have you ever explored these buildings?" he asked.

"They have all been quite thoroughly searched," I said. "There were any number of useful or valuable objects inside them." As a matter of fact, if you will observe my writing desk—Quite ancient. Oh, yes certainly Grand Rapids manufacture. That is, I believe, in the Lakes Confederation now, but this was made before those times.

The barbarian shook his head. Again!

"You mean, there wasn't no archeological work done? Just looting?"

"I'm afraid not," I began. "You see—" But Zhosef anticipated me. What an angel!

"We have no time—no strength. Active scholarship is a luxury we cannot afford. We have a good knowledge of history, because there is always someone who keeps a record of what goes on around him, even in the worst of times. But research—no, that we do not have. You must understand that we are not a powerful state. What you see around you was built by an empire, with granaries and factories scattered over the face of immense lands. But when the sea made the ports useless and buried the rail hubs, it was impossible to re-organize the empire quickly enough. It was a slow process, as men count time. But it happened in a blinding flash on the geological scale, and societies, too, are often like mountains. Too, there were many other

things going on that strained the empire's economy. Natural resources were already dwindling, population was already beginning to choke—and there were enemies. It was much the same all over the world. And the sea took so much from what we had.

"There was some attempt to build dikes and causeways to the high ground. But one cannot dike around a city of this size—and even where some of the smaller cities were luckier, the first few storms were the end of them. And meanwhile the food-growing regions could not support the inflowing populations from the seaboard. They broke away from the empire, and closed their frontiers. Other sections husbanded their local wealth—it was the same all over the world."

The barbarian— Yes, shook his head. "Sounds fantastic. A big civilization—building up to a peak—sendin' us out—and then, just a little bit after that, drowning, comin' apart—dyin'."

It was when he began to use phrases like that, looking around him at the buildings with awe, that I knew I had him. Furthermore, it required no effort on my part. I had only to sit here beside him, occasionally trailing my fingertips in the water for the sake of something to do, and he would go nicely down the road by himself without any prodding, thank you. Good barbarian horse that he was.

"All over the world?" he asked, now. "Everybody's in the same fix?"

Poor and miserable—decadent—he almost said. Phaa! Fat with the wealth of his virgin planets, swaggering about, condescending to the two mean representatives of the miserable race living in the shadow of its former glory—but, gently, Charles, gently, I said to myself. No good comes of fretting the fatted calf with arguments. It will lose weight if one does.

"No," I said in a voice of calm resignation. "After all, it has been some time, now. There are a number of quite well-to-do States, here and there about the surface of the world. But there has been a drastic economic realignment. They are all in regions which were once undeveloped territories, and we can never hope to be again the power we once were. Or, rather, to be frank, our State can never hope to be what it was when it was a part of the empire." True enough. He would only look at the physical things, like his spiritual brethren from those States on this world which were wont to swagger in the midst of our physical weakness. The heritage of a culture spanning a thousand years—the refinement of centuries, the sophistication of true civilization—these he would never understand. The realization that any culture capable of producing such men as I is more to be reckoned with than a State which counts its wealth in railroads—that was beyond him, as it was beyond the callow States which think they are the masters of this world. The simplest nuance of

emotional awareness was beyond him. The sophistication which holds in contempt anyone who blunders through social intercourse like a savage, who has no culture, no polish, no *maniere*—who has nothing but wealth and power—who does not feel the supreme, bittersweet pang of drifting at the feet of timeless gargoyles . . .

Gently, Charles. Gently.

It was now toward noon, and excellent Zhosef, who pays close attention to such things, brought out a package of lunch. In a gesture of bumbling good will—bumbling, but inspired with near-Promethean genius—he offered the colonial a share.

The barbarian looked at it, and I, for a moment, seeing that Zhosef was holding a half-loaf of bread and a few slices of chicken, thought he was being contemptuous of our food. But I should have guessed that contempt was utterly not in his poor repertoire of emotions.

"Is that roasted bird of some kind?" he asked, somewhat like a man contemplating a marvel.

Zhosef nodded. "Chicken."

The colonial's face lit up. "My gosh! I read about it when I was being trained to come here! Look—I'm not supposed to eat your food. No tellin' how much we've changed. But a little nibble won't hurt none, I guess. Boy—wait'll I get back and tell 'em I had some Terrestrial chicken!"

He took not a nibble but a full-

sized bite, masticating noisily and with great enthusiastic lip-smackings.

"Say, that's *good*! That's mighty good! Boy, there's a lot you people have that we've lost. We got lots o' cattle, but the fowls didn't make the trip."

The thought of acres of pasture, covered by tons of beef, complicated my emotions as I chewed on my diminished half of our holiday treat. I was cursing Zhosef for being an overgenerous fool, when the colonial said:

"Well, now, maybe you'd like to try somethin' of mine?" He fumbled with another apparatus at his belt, unclipped it, and handed it to me. "Here. You hold it, so it'll know what'd give you trouble. Now push that button."

I did so, and the colonial opened the apparatus and withdrew an oblong of some kind of stuff, which he offered to me while Zhosef took his machine and went through the same procedure as had I.

The block of food was about the size of a packet of tobacco, and a greenish-brown color. I looked at it with some revulsion, expecting it to taste like the processed plankton it resembled. But I tried it. In short order I consumed it all, almost literally feeling energy surging through me. And the taste was not at all like plankton. It was, as a matter of fact, much heartier than chicken. Excellent. Zhosef, too, I could see, was much astonished.

"This's quite a gadget," the

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colonial couldn't refrain from boasting, patting the contrivance as he replaced it on his belt. "Pulls in air-borne molecules and turns 'em into food." He smiled deprecatingly. "It's pretty plain stuff, though. Nothing to match the natural stuff you fellows have. About the only thing you can say for it is it sticks to your ribs."

Ugh. The ape and the tiara.

But it *was* an extremely clever bit of mechanization. The boundless material ingenuity of the burgeoning barbarian is frequently marvelous. Why should it not be? He has a wealth of resources, and nothing to diffuse his energy. Lacking all civilized emotions and preoccupations, he is free to gallop toward any horizon he chooses. Trampling roses as he goes.

So we spent the day, cruising endlessly among the be-weeded and barnacled colossi of New York, while faithful Zhosef bent to the oars and the barbarian marveled. It was not till evening that I heard the angry *putt-putting* of the launch echoing from the building behind us, and by then I was quite glad to the period it put to the colonial's logorrhea.

There was a bad moment with the officials in the launch, but a few well-chosen words aside to the representative of the Ministry of the Interior soon set that to right, and, as you know, added materially to the status of my career.

There was one parting exchange with the barbarian:

"Look—I want to thank you fellows for skippering me around all day," he said clumsily as he climbed into the launch and we tied our painter to its stern.

"It was nothing," I said. "Our pleasure."

"No—I took up a lot of your time. I guess it must have been pretty dull, listening to me run off at the mouth."

"We were honored."

"Well, I still want to do something for you. There's got to be something you need that I can rig up for you. How about if I drop by your houses in a few days? Maybe there's somethin' you can think of by then. I'm pretty handy with machines. Maybe your wives'd like something that'd do the dishes for 'em. Something like that."

"Oh, no, thank you—" Zhosef began. Well, even the best of us have our weak moments, and naive genius only goes so far. I kicked his ankle.

"That is very kind of you," I said. I gave him my address—Zhosef somehow did not have a pencil and paper of his own—and so we parted, him in the launch with the officials, and Zhosef and I towing behind at the end of our painter. The exhaust of synthetic gasoline was very foul, but I thought the day well worth it, and Zhosef, after all, was tired from rowing.

And there you have it. The other States of this formerly unhappy continent may have taken from us

our riches and our food, but they did not rob us of our greatest resource. And the sea only enhanced its value. Of all the States of the world, ours was the repository of the most dramatic monument from the imperial past, and ours was the land from which the colonists originally came. So they come from Centaurus and all the barbarian sub-colonies, to marvel over the drowned city, to photograph, to measure, to stand in awe. To emulate our dress, acquire our accent, to return home and boast of their trip to New York.

To purchase souvenirs of glory, as proof of their visit. I am told it is a lucrative trade. I have a cousin, a cabinetmaker, who is quite good at period furniture. He has a little whimsey about the volume of New York furniture now exceeding the volume of New York. It may be. For instance, I have also a nephew, a mason, who will shortly be able to produce a most convincing water-worn gargoyle. It is a secret process he developed himself, and cannot fail. The return will be quite high.

Unfortunately, the acids required are quite expensive, and he seeks capital. A gentleman who became interested now would make a tidy...

But I leave that entirely up to your discretion.

They come, they eat our cookery—why not, it is with their own adaptations of their own machines that we make the food—they leave silver and machines in return.

They are an unbearable lot, of course, but one puts up with the unbearable on occasion. And meanwhile the first large class of our students has come home from their technical academies, and we are no longer in such a poor position when we discuss boundary questions with our neighboring States.

And time passes. They will grow older, and we who are already old are better versed in the techniques of living under those circumstances. We grow again, in our own way we prosper, and some day, when we have all we need...

Who knows?

THE END

DEFINITION

- Fair Fight: 1. (Individual). A fight I win just as I expected to.
2. (Social). A fight in which each side has an equal chance of winning, but is too stupid to toss a coin instead.

NAMES!

NAMES!

NAMES!

Sometimes a chemist finds an element and names it triumphant dedication; sometimes he names it out of angry frustration—and sometimes by sheer mistake. But there's a story behind the name of nearly every element.

BY ISAAC ASIMOV

Illustrated by Freas

In 1954 and 1955, three elements were discovered, with atomic numbers of 99, 100, and 101. To be precise, they were manufactured. We can imagine an infinite number of elements if we suppose more and more particles crammed into the nucleus. In a practical sense, though, we are now approaching the limit. Each new and more complicated element is harder to put together and breaks down more quickly. In the case of element 101, exactly seven-

teen atoms were manufactured and those lasted only a few hours.

These three elements, then, represented nearly the last chance chemists might have of immortalizing something or somebody through the name of an element.

The result was good. Element 99 is now *einsteinium*, element 100 is *fermium* and element 101 *mendeleevium*. Einstein is no news to anyone in science fiction, writer or reader. Fermi was one of the lead-

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ers in the development of controlled fission. Mendeléev first developed the periodic table of elements in its modern form. By using that table he predicted the existence and properties of three new elements, and lived to see those elements discovered and his predictions verified.

In addition, element 96—first manufactured in 1946—is called *curium* after Pierre and Marie Curie, who first discovered short-lived radioactive elements and who invented the term "radioactivity."

But, alas, not all the elemental names reward and honor achievement so fittingly. The chance to do so has been lost. The discoverer of an element is, by convention, allowed to name it at whim. As a result, the names of the one hundred and one elements are a weird collection of memoria to national pride, mythological allusions, first impressions, genteel swearing, trivia, and even chemical errors.

For instance, of the one hundred and one elements, exactly six have been named after people. I have already mentioned four, all of them unstable elements that do not occur in nature. But two elements remain, stable ones that do occur in nature. Who, then are the lucky gentlemen who stand alongside the giant names of Einstein, Fermi, Mendeléev and Curie.

Well, it seems that back in 1794, a Finnish chemist named Gadolin found a new kind of mineral in Sweden, near a small town I will have occasion to mention later on.

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He named it after the small town and, having done so, passed out of chemical history as far as I know.

But then an astonishing thing happened. In the century from 1803 to 1907, a series of fifteen elements—with atomic numbers from 57 to 71 inclusive—were discovered, one after the other, in this mineral or others like it. These elements are referred to as the "rare-earth elements." In 1880, the ninth one, element 64, was discovered, and the discoverer in casting about for a name, remembered that Gadolin had first described the mineral that contained these elements. Element 64 became *gadolinium*.

If you think Gadolin is rather obscure to be so honored when so many of the greatest are not, consider this:

Element 62 is *samarium*. Most of my life, I somehow had the vague notion it was named after the good Samaritan, but of course it isn't. Samarium is called so only because it was found first in a mineral called "samarskite." And going one step farther, samarskite got this name because a sample of it was originally found in Russia in a region under the jurisdiction — mineralogically speaking—of a Russian mining engineer named Samarski. Of such accidents may deathless fame be manufactured!

Of the seven people honored elementally — remember, curium is named after two people—it so happens that none is a native-born American. By birth, one is German,

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one Italian, one French, one Polish, one Finnish and two Russian. Einstein and Fermi, however, ended their lives as American citizens.

Places are better represented than people among the elements, but often in unrecognizable form. The cult of classicism is strong in scientific nomenclature, a hangover from the days when Latin was the international language of learned men. Consequently, no one used the real name of a city or country if a Latin name was available. If one wasn't available, a Latin name was made up.

It is for this reason that, if I told you that the largest city to be memorialized by the name of an element was Paris, France, you would probably be unable to find the element in question. You will find no "parisium" listed in the table of elements. However, you will find *lutetium*, which is element 71 and the last rare earth to be discovered (1907). You see, there was a miserable little village in ancient Gaul on the site of modern Paris and the Romans called it Lutecia.

The discoverer of lutetium was a Frenchman, hence the honoring of Paris, but it was the Scandinavian area that was really blanketed. Scandinavia was rich in the ores that contained the rare-earth elements so even non-Scandinavians turned to that northern peninsula for inspiration.

Take *holmium*, element 67, for instance. It was also discovered by NAMES! NAMES! NAMES!

a Frenchman—in 1879—but he named it after Stockholm. Stockholm has no Latin name, so he made one up: *Holmia*. The same chemist in the same year discovered *thulium*, element 69. This time Thule was the place-name used. To the Romans, Thule was a mysterious island in the far North, supposedly the extreme northern limit of land. It has been identified by some with Ireland and some with Iceland, but the discoverer of thulium took Thule to represent the Scandinavian peninsula and named the element accordingly.

This gave Scandinavia a double-barreled victory, for in the same year element 21 was discovered and named *scandium* after guess what.

A case similar to holmium is that of element 72, discovered in 1923 by a pair of Danish chemists who named it *hafnium*. From the nationality of the discoverers, you may be able to guess the source of the name, which is Copenhagen. They used the made-up Latin name of *Hafniae*.

No other large cities are found among the elements, none of the world metropoli. But there is a little city that has not one, not two, but four, count 'em, four elements named after it. Not exactly a city or even a town either; not even a dot on any map I've ever seen. I have a tremendous atlas at home with a tremendous gazetteer thereto attached and in the years I have had it, there are only two towns I ever tried to look up that I couldn't find. One is my birthplace, Petrovichi, which is somewhere in Russia, and the other

is this village with four elements named after it.

It is called Ytterby and is in Sweden, somewhere near Stockholm, as best I can gather. It was near Ytterby that Gadolin found the mineral which was the starting source for the rare-earth elements. He called the mineral "yttria" after the town. When chemists later found they could divide yttria into two fractions with different chemical properties, they called the fractions "erbia" and "terbia," still after the town. In 1843, when the mineral yielded three new elements—two of them rare-earth elements—they proceeded to call one *yttrium* (element 39), the second *erbium* (element 68) and the third *terbium* (element 65). Then, in 1878, when element 70 was found, chemical invention could go no further than to pick on Ytterby again and the element was named *ytterbium*.

There is another little town, this time in Scotland. I can't find its population, but at least I can find it on the map. It is Strontian in Argyll Country on Loch Sunart. A particular mineral was first discovered in a lead mine near Strontian in 1790 and called "strontianite." In 1808, when element 38 was discovered in that mineral, the name chosen for it was *strontium*.

Several nations are honored. In 1875, a Frenchman discovered element 31 and named it after France. Only, as was almost obligatory, he took the Latin name for France which was "Gallia" and there is the

element: *gallium*. (As it happened, in 1939, other Frenchmen discovered element 87 and they honored France under its proper name, calling the element *francium*. France almost made it three-times-honored, too, since on two different occasions, "celtium" was proposed as the name of an element after the Gauls, who were Celts, you know. Both times, however, the element in question turned out to be already known and already named something else.

In 1886, a German discovered element 32 and decided Germany was worth an element as well as France. In his language, Germany is called "Deutschland," but in Latin, it is "Germania." He didn't hesitate. The element is known as *germanium*.

When the Curies discovered the first known short-lived radioactive element, they decided to honor the birthplace of Marie Curie, which happened to be Poland. That is why element 84 is *polonium*.

After studying the list of elements, you may not believe it, but Russia is also included. In 1855, a German chemist discovered element 44. He extracted it out of an ore that had been dug out of the Ural Mountains. Russia was a natural, but he used an old-fashioned Latin-sounding name for it, Ruthenia. The element is *ruthenium*.

In 1925, German chemists discovered, or thought they discovered, two new elements, 75 and 43. With fine impartiality, they named one for the west (of Germany) and one for

the east (of Germany). Element 75 was named for the Rhineland and called *rhenium*. Element 43 was named for Masuria, a district in East Prussia—now part of Poland, by the way—and called *masurium*.

However, masurium didn't stick. It turned out the discoverers were mistaken. Although masurium was listed in tables of the elements for fifteen years—usually with a question mark—it washed out in the end. Element 43 is radioactive, comparatively short-lived. None exists in the crust of the Earth. In 1939, samples of it were manufactured in the laboratory and it received a new, and now official, name. Masurium, therefore, is one of the "phantom elements."

Place-names reminiscent of classical times also occur. One of these is a district in Thessaly, an area in Northeastern Greece. The district was named Magnesia. A white mineral found there was known to the Greeks as "magnesia lithos" (Magnesian stone). In 1808, element 12 was found to occur in Magnesian stone, so the element was named *magnesium*.

Magnesia was commemorated in still another way. A black mineral was found there which had the odd property of attracting little bits of iron. The Greeks called this mineral "magnes" and from that our own word "magnet" was born. (The Magnesians of Thessaly, by the way, established a colony in Asia Minor which, out of unimaginative nostalgia, they called Magnesia. This cre-

ates some confusion as to whether it is the European or the Asiatic Magnesia that is being honored.)

The story doesn't quite end there. The medieval alchemists confused another black mineral—today called "pyrolusite"—with magnes. As they copied each other's words, misspellings crept in and magnes eventually became "manganese." So when element 25 was discovered in pyrolusite in 1774, it was called *manganese* after a mineral and district with which it had nothing to do. Under proper conditions, you see, even mistaken identity and mistaken spelling can be hallowed.

Much simpler is the case of element 29, a metal very useful to the ancients. The Romans got their supply from mines on the island of Cyprus, so they named the metal after the island and in English the word has become *copper*.

You'll notice that all the place names, so far, are European. In fact, element 63, discovered in 1901, is named *europium*.

However, the New World is represented. Most of the artificial radioactive elements manufactured since 1939 were made in American laboratories and by 1944 when element 95 was manufactured, the name *americium* had become inevitable. Furthermore, most of the discoveries were made at the University of California in Berkeley, California, so in 1949, when element 97 was prepared, it was named *berkelium*, and

when element 98 was synthesized in 1950, it was called *californium*.

The mention of californium brings to mind the fact that three American states are represented by phantom elements. No less than three. In 1926, chemists at the University of Illinois thought they had discovered element 61 and called it *illinium*. In 1929 and 1931, chemists at the Alabama Polytechnic Institute thought they had discovered elements 87 and 85 and called them *virginium* and *alabamine*. In all three cases, the chemists were mistaken. Elements 61, 87, and 85 are all radioactive and short-lived. They exist in nature, if at all, in undetectable traces. They have all been manufactured now and given new, and now official, names. One of them, element 87, is the francium I mentioned earlier. Element 61 proved a disappointment to another group of chemists as well. Two years before the University of Illinois boys made their report, workers at the University of Florence—Italy—thought they had it and called it *florentium*. For a while, there was considerable argument about it on strictly national lines, but it was all for nothing. Both groups were mistaken, both names washed out.

An element slipped out of the grip of the United States just a couple of years ago, quite unfairly, too. The story, in its bare essentials, goes like this. Back in the 1600s, Connecticut's first royal governor sent a sample of a novel mineral back to England. In 1801, an English chem-

ist studied the mineral and extracted what he thought was a new element. He wanted to name it after the United States—which had recently become independent—since it was the first element ever isolated from an American mineral. There was no Latin name for the United States, so, remembering the poetic name, Columbia, he called the element *columbium*.

However, there was some argument as to whether columbium was really a new element or just an old element in an unfamiliar shape. In 1844, the issue was settled. It was a new element; element 41. The chemist who proved this gave it a new name. For the next century American chemists called it columbium and European chemists called it something else. In 1949 an international gathering of chemists decided a number of questions of nomenclature and, among other things, decided to make the European name official. The name, columbium, had a forty-three year priority, too!

We can end the place-name elements with elements 52, discovered in 1783, which caps the climax by being named after the Earth—after the Latin word for the Earth anyway. The Roman god of the Earth is Tellus, and element 52 is *tellurium*.

This leads us right into another group of elements. The Earth is not only a place, it is also an astronomical body. Excluding tellurium, there are seven, and possibly eight, ele-

ments, elements named after astronomical bodies.

I can begin with the sun and the moon. In 1818, element 34 was discovered. Its properties were quite similar to tellurium, which had been discovered thirty-five years earlier. Since tellurium was named for the Latin god of the Earth, then, by symmetry—remembering that the moon was Earth's faithful companion throughout the eons—element 34 should be named for the Greek goddess of the moon. She being Selene, the element became *selinium*.

The story of the sun's role in this drama of names is much more dramatic. In 1868, there was a solar eclipse visible in India. A group of astronomers were there for the occasion. For the first time, light from the upper reaches of the Sun's atmosphere—the lower regions being conveniently obscured by the moon—was passed through the spectroscope. A yellow line was observed in a place where no line had ever been observed before as the result of any earthly radiation.

It seemed that the line could only represent a new element, unlike any known on Earth. Since the element was only known in the sun, it was named for the Greek god of the sun, Helios. The element—which eventually turned out to be number two in the list—was called *helium*.

It wasn't until 1895 that helium was found on Earth.

Now there's a certain risk in naming an element if you don't know

anything about it. Let me explain. The elements that were known to the ancients and those discovered by the medieval alchemists and even the first few discovered in modern times were named any old way.

After about 1750, however, a system was established. Elements were divided into two groups, metals and non-metals. The names of all metals—with a few exceptions—were given endings -um or -ium. That sounded nice and Latin, you see. The names of all non-metals—with one or two exceptions—were given endings -on, -en, or -ine. That sounded nice and Greek. (This is with particular reference to the English-language names.)

Now it so happens that most elements are metals. To be exact, there are nineteen non-metals and eighty-two metals. This disproportion was quite noticeable by 1868, at which time there were thirty-five elements with -ium endings as opposed to eight elements with the -on type ending.

Now there was no way of telling from a line in a spectrum whether an element in the sun was a metal or non-metal, if the line were the only information available. Element 2 might have been named "helium" or "helion." On a purely random basis, the odds in favor of "helium" were better than four to one, and it was named so.

But long shots come in sometimes. This one did—and how. Not only is helium a non-metal; it just happens to be the most non-metallic

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non-metal that exists. Yet it has the metallic ending, you see. What's more, nothing can ever be done about it. The name, as it is, wrong ending and all, is frozen firmly into the chemical literature.

To pass on to other matters, there was actually a small fad about 1800 for naming elements after newly discovered planets.

The two outermost of the classical planets were Jupiter and Saturn, in that order, Saturn being, mythologically, the father of Jupiter. In 1786, a new planet was discovered still further out than Saturn. To keep the family arrangement neat, the new planet received the name of Uranus who, mythologically, was the father of Saturn.

In 1789, when element 92 was discovered, it was named after the brand new planet and became *uranium*.

(One hundred fifty years later, this had repercussions. In 1940, when elements 93 and 94 were manufactured, element 93, which was one past uranium, was named after the planet one past Uranus. This was Neptune and the element became *neptunium*. Then element number 94 was named after the planet still further out, Pluto, and became *plutonium*. With that, chemists ran out of planets.)

In 1801, the first asteroid was discovered, followed shortly by three others. The planets being named for Roman gods, the asteroids were named for Roman goddesses and

these first four were called Ceres, Pallas, Vesta, and Juno. Therefore, when elements 58 and 46 were discovered in 1803, they were named, respectively, *cerium* and *palladium*. (A few years later "junonium" and "vestium" were also reported but these turned out to be mistakes.)

Now for a more complicated case. Element 80 was known to the ancients and the older an element is, the more doubtful is the derivation of its name. In the case of element 80 the name is *mercury* and it seems beyond question that it is named after the planet, Mercury.

But why? Well, mercury is the only metal which is liquid at ordinary temperatures. If some is spilled, it breaks up into a million droplets that evade recapture. It seems more "alive" than ordinary solid metals that stay in one piece and drop, clunk! Now then, of all the planets known to the ancients—or to us—the one that moves across the sky most rapidly is Mercury, which is the closest to the sun. Why not name the "livest" of the metals after the "livest" of the planets.

This "aliveness" of mercury is reflected in its other common name of *quicksilver*, where the "quick" part of the name is not a synonym of "rapid," but a synonym of "alive" as in the phrase, "The quick and the dead."

The name, mercury, is probably due to the medieval alchemists who called various metals by the names of the planets for mystic and astrological reasons. The old Roman

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name for mercury was *hydrargyrum*, which comes from Greek words, meaning "liquid silver." That has gone out of fashion but remains as a fossil remnant in the chemical symbol for mercury. Chemical symbols are a shorthand used universally in the scientific world by international agreement. Ordinarily, the chemical symbol for an element is the initial letter of its name or the initial letter plus another letter from the body of the name. Thus, the chemical symbol of uranium is U, that of neptunium is Np, of plutonium Pu, and so on.

The two chief languages of modern chemistry are English and German. In several cases the two languages have different names for the same element, but always they use the same symbol. Sometimes the symbol is taken from the English name, sometimes from the German. And sometimes it is taken from neither but from the old Latin name. The English language has named element 80 mercury; the German language calls it *Quecksilber*. The symbol used in both languages is Hg, for *hydrargyrum*.

You may think this is confusing, and it is, at first. It's amazing though, how you get used to it.

Finally, a doubtful case. In 1669, a chemist studying urine, discovered a new substance—which eventually turned out to be element 15—and out of a most unglamorous substance plucked undying fame. In the form in which he isolated the element, it combined spontaneously

with the oxygen of the air so that it glowed visibly in the dark. Consequently, the discoverer named it *phosphorus*, from Greek words meaning "light bringer."

But there's just a chance an astronomical body may have been involved. The ancients gave the morning star and evening star different names, not recognizing at first that they were only the same planet—Venus—in different portions of its orbit. The morning star was *Phosphorus* and the evening star *Hesperus*. There may just have been enough of the alchemist in the discoverer for him to want to associate the new element with a planet, as alchemists usually did. What better name for an element that shines in the dark than that of the morning star?

The heavenly bodies so far mentioned are all members of the Solar System. The stars as such are not found among the elements. "Denebium" and "aldebaranium," after the stars Deneb and Aldebaran, were proposed, but the supposed elements turned out to be mixtures. For a while, the element, lutecium, was known by the alternate name of *cassiopeium* after a group of stars, the constellation Cassiopeia, but that never caught on and has now gone by the board.

In the list of planetary names, it is difficult, without knowing the history, to tell whether an element is named after a planet or a Roman deity. Uranus, Neptune, Pluto, and

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Mercury are both planets and gods; Ceres and Pallas, asteroids and goddesses. There are elements, however, the names of which have definitely mythological origins, without possibility of confusion since no astronomical objects have the name in question.

For instance, consider element 73, discovered in 1802. It is a metal which is not acted upon by strong acids. This struck the discoverer as quite remarkable. (Darned if I know why, though; gold and platinum were known at the time and each is even more resistant to the action of acids.)

Anyway, the discoverer thought of Tantalus who, in Greek myth, was condemned to Hades, where he stood up to his chin in water, yet suffered agonies of thirst because every time he stooped to sip, the water-level sank, (hence our word "tantalyze.") This new metal, like Tantalus, could stand in acid and yet not "drink," so it was named *tantalum*.

Element 41 is closely related, chemically, to tantalum, so in 1844 it was named after Niobe, the daughter of Tantalus, and called *niobium*. This, by the way, is the element that should by rights be called columbium.

Element 22, when discovered in 1791, was remarkable for the way it reacted rather than reverse. Its combination with oxygen was so tight that it held together under an amount of heat sufficient to break up all other known molecules. This grip of giant strength reminded

chemists of the giants of Greek mythology, the Titans, so in 1794, the element was named *titanium*.

In recent years, Greek myths got one more play. In 1947, element 61 was identified among the fission products of uranium. (This was the "illinium" and "florentium" I mentioned earlier.) It appeared out of the atomic furnace of the uranium pile carrying atomic fire with it in the form of radioactivity. The discoverers were reminded of the Greek Titan, Prometheus, who brought fire down to Earth from the sun. Element 61 is, therefore, *promethium*. Another proposed name for this many-named element was *cyclonium* after the cyclotron, but that didn't make it."

So far, only Greek and Roman mythology has been involved. There are two elements, however, named after Norse deities. Both, naturally enough, were discovered in Scandinavia by Scandinavians. Element 90 was discovered in 1829 and was named after the Norse god of storm and thunder, Thor; hence, *thorium*. Element 23 was discovered in 1830 and named after Freya, the Norse goddess of beauty. One of her alternate names is, apparently, Vanadis, so *vanadium* it is.

Finally, two elements received their mythological names with less forethought and more honest swearing. It seems that Saxon miners working in their iron mines came across the ores of elements 27 and 28. Those ores behaved wrong. They

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didn't act like iron ore, copper ore, or silver ore.

There was only one logical explanation to the aggrieved miners who tried to handle these strange rocks and couldn't. The ore was bewitched; the evil eye had been put on it. And by whom but by the mischievous spirits of the Earth whom the German peasants called "kobolds" (from a Greek word "kobolos" meaning "demon," which also gives us our "goblin"). So in 1737, when element 27 was first studied by a chemist, it was called just about that, *cobalt*.

As for element 28, to the miners it seemed copper that the devil had transmuted in order to plague honest men. They called it kupfernickel, which is German for "devil's copper." (The "nickel" part being a colloquial term for the devil related to our own phrase "Old Nick.") Kupfernickel was shortened to *nickel* and that became the official name of the element in 1751.

So if you have a five-cent piece in your pocket, take a good look at it. It may say "In God We Trust" on it, but the coin is named in honor of the devil just the same.

We have quite a few elements named after the minerals in which they are found. I've mentioned some like magnesium and yttrium that were named after minerals that were in turn named after places. Now let's consider those mineral-born names that are not connected with places.

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Some very common minerals are involved. For instance, one of the most common and least glamorous components of the Earth's crust is flint, a hard rock. The Latin name for flint is "silex." Consequently, in 1824, when element 14 was found to occur in flint it was given the name *silicon*. The Germans and French call it *silicium*, but the element is a non-metal, and they oughtn't to.

A perfectly analogous case involves another common mineral, limestone. The Latin name for it is "calx." Element 20 occurs there and when isolated in 1808, it received the name *calcium*.

Even water served as inspiration. The Greek word for water is "hydro." Element 1 occurs in water and when that element—a gas—burns, it forms water. Hence, in 1790, some years after it was first discovered, it received the name of *hydrogen*. The -gen suffix comes from a Greek word meaning "gives birth to." Hydrogen, then, in Greek, means "gives birth to water" which is true enough. Analogously, the Germans call hydrogen, *Wasserstoff*, meaning "water substance."

Now for a miserable mix-up which I hope I can make clear. There are two common minerals, one of which is called "soda" and the other "niter." Both contain element 11. This element was first isolated by an English chemist in 1807, who named it *sodium*, after soda. However, the Germans chose to call it *natrium* after niter. And in one

way, the Germans won out. The chemical symbol for sodium, even here in America, is Na, for natrium.

To make confusion worse, niter also contains element 7 and when that was isolated, in 1772, it was given the name *nitrogen*, meaning "giving birth to niter." So here are two elements with nearly the same name. The Germans, of course, don't call element 7 nitrogen. They call it *Stickstoff*, meaning "suffocating substance" because nitrogen is the portion of the air we can't use and in which we would suffocate if it were the only component of air. Similarly, the original French name of nitrogen was *azote* from Greek words meaning "no life." That name dropped out but it still persists as a sort of fossil remnant in organic chemistry where various groups of nitrogen-containing compounds have the stem -azo- in their names. For a while, the French even violated the international conventions of symbols for the elements by symbolizing nitrogen as "Az" for azote, but I checked recent numbers of French journals and they don't seem to be doing that anymore. They're using the symbol "N" like everybody else.

A close relative of sodium is element 19 and it is the occasion of another mix-up. A certain useful substance was obtained, in earlier times, by burning plants, soaking the ash in water, then boiling the water away in large iron pots. The white powder left behind was called by the English farmers "potash"—

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the ash in the pot. The same substance was called "al-qili" by the Arabs, who did a lot of alchemical work during the Middle Ages. Al-qili means "the ash" in Arabic.

When in 1807, the English chemist who discovered sodium also discovered element 19 and found that it occurred in potash, he Latinized the English word, potash, and named the element *potassium*. The Germans Latinized the Arabic word and called the element *kalium*. Once again, the Germans won. The chemical symbol for potassium throughout the world, is K, for kalium.

Now for another monument to a mistake. Element 8 received its name in 1774. This element occurs in air and, in fact, is the part of the air we actually utilize. It occurs in water. It occurs in almost every compound of the soil. It is by far the most common element in the Earth's crust. If one wanted to name it after some substance that contained it, almost any substance, chosen at random, would do. The chemist who did the naming, however, did not choose at random. He chose carefully and he was one of the greatest chemists who ever lived. In fact, he is known as the father of modern chemistry. So wouldn't you know he'd be wrong?

He named element 8 *oxygen* from Greek words meaning "giving birth to sourness" because he thought oxygen was a necessary component of all acids. Alas, it isn't. Hydrogen is, but not oxygen. Wrong element!

The Germans went right along with that particular mistake. They

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call oxygen *Sauerstoff*, meaning "sour substance."

Error, by the way, begets error. Begin with the erroneous assumption that all acids contain oxygen. It follows that hydrochloric acid—one of the strongest, cheapest and most common and well-known acids—contains oxygen. The old name for this acid is muriatic acid. Now if muriatic acid is treated so as to remove the hydrogen which is also contained in the molecule, a greenish gas is formed. If this gas is dissolved in water once more, muriatic acid is formed once more. Good! Since this gas is muriatic acid minus hydrogen, it must contain some element—the nature of which was then unknown—*plus oxygen*. The oxygen had to be there, you see, by the laws of error. The gas was, therefore, called "muriatic oxide" and all one had to do was to get rid of the oxygen and be left with the new element, which received, in advance, the name *murium*. However, nothing could split oxygen out of the muriatic oxide and all sorts of work came to nothing. For alas, alas, muriatic acid contains no oxygen. Nor does "muriatic oxide." It was muriatic oxide itself that was the element. For years, the chemists had it and didn't know it.

(Incidentally, the Germans are worse off than we in the case of chemical symbols. They win out in the matter of sodium and potassium, but that's about all. They call nitrogen, hydrogen and oxygen, Stickstoff, Wasserstoff and Sauerstoff, but

they have to use the international symbols N (for nitrogen), H (for hydrogen) and O (for oxygen.) Tough on the German kids taking their first chemistry course and wondering why.

Here's another common substance of name-inspirational value. Coal is mostly element 6. The better anthracite grades are almost entirely element 6. The Latin word for coal is "carbo." Add an "n" to get the non-metallic ending, and we have *carbon*. The Germans call carbon *Kohlenstoff* for "coal substance" but the chemical symbol is C.

In 1827, element 13 was found to occur in a common astringent mineral named alum (Latin, "alumen"). The name *aluminum* was inevitable—with the accent on the second syllable. The French, Germans, and also the British all call it *aluminium* with an extra "i" and the accent on the third syllable in the case of the British and Germans—last syllable, as always, in the case of French.

The Greeks called a certain yellow mineral "arsenicon." The Unabridged traces that back through Persian to a Sanskrit word meaning "yellow." There is also a Greek word, "arsenicus," meaning "valiant" for what that's worth. In any case, when the alchemists found a new substance in arsenicon—which later proved to be element 33—they called it *arsenic*.

Arsenic isn't the only element that traces back to Persian. The Per-

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sian word for "white" is "borak." The Persians gave that name to a certain white mineral which we now call "borax." When element 5 was found to be a constituent of borax in 1808, the element was named *boron*.

The Arabic, or perhaps Persian, word for a precious stone is "zerk," "zargun," "jargoon" or something like that. A particular precious stone that reached the west through the Arabs came to be known as a "zircon." Since element 40 was found in 1827 to be a constituent of zircon, it was named *zirconium*.

Nor is zirconium the only element to boast a jewel in its ancestry. The beryl is a far more precious stone. Transparent green varieties of beryl are known as emeralds and these are among the most valuable gems of all. Element 4 was found, in 1798, to occur in beryl, and so it was named *beryllium*.

The original discoverer of beryllium, by the way, hesitated about naming it so the editors of the journal in which he reported the find suggested it be called *glucinum* and for a long time that ran neck and neck with beryllium as a name for the element. In the end, it lost out. Glucinum is derived from the Greek word "glykys," meaning "sweet," because some of the beryllium compounds are sweet to the taste.

The name of element 83 offers problems. It was discovered long enough ago to make the origin uncertain. One theory is that it occurred in a white mineral which German miners simply called

"weisse Masse" — white mass — which was shorted to "wismat." The alchemists, in Latinizing the name changed the "w" to "b" since "w" does not occur in Latin. Bismat became *bismuth*, today's name for the element. The Germans still call it *Wismut*, however, retaining the "w."

More certain but also more roundabout is the story of a white mineral used in metal-working. When two pieces of metal are welded together, this particular mineral is sometimes used. It melts easily and flows over the ends of the metal pieces being joined, combining with impurities on the metal and leaving nice clean surfaces that fuse together strongly.

The mineral was named "fluorspar." The "fluor" part is from the Latin word "fluere" meaning "to flow." The "spar" was a miner's term for any of a number of minerals, a kind of trade jargon for "stone." In other words, fluorspar meant "stone that flows." (Compounds such as fluorspar, are generally known as "fluxes," also from the Latin word "fluere.")

In 1886, element 9 was isolated and, since it occurred in fluorspar, it was named *fluorine*.

Most rocks are about as heavy as aluminum. Occasionally, one comes across rocky minerals that are twice as heavy as ordinary rock and they are often named with that in mind. One such mineral, for instance, is called, in English, "heavy spar," — "spar," as I said, being miner's jargon for "stone." Its more formal

name is "barytes" from the Greek word "baros" meaning "heavy." In 1808, element 56 was found to occur in barytes and was named *barium*.

In Sweden, also, a heavy mineral was discovered and was also called "heavy stone"—only in Swedish, so that the phrase came out, "tungsten." When, in 1783, element 74 was found to be a component of that, there was, for once, no fanciness whatever involved. The element was named *tungsten*. However, in Germany, the same element was found to occur in a mineral called wolframite—derivation unknown—so it was given the name *wolfram*. In the same recent international conference that decided that columbium was really niobium, it was also decided to make wolfram the official name. Perhaps that is just as well. Even though we called the element tungsten, we used the chemical symbol W for it, after wolfram. However, the Americans and British are putting up strong resistance, and I don't see signs yet of any mass-switch in the English-language literature from tungsten to wolfram.

Element 3 is named most prosaically of all these. It was discovered in 1817 and having been isolated from a stony material—as almost all the elements were—it was named *lithium* from the Greek word for "stone." Nothing more, just "stone."

Element 48 was discovered in 1817 in a kind of ore known to the

Greeks as "kadmia." The element was named *cadmium*.

In the flurry of naming, two elements got their names from two other and completely different elements. This sort of mis-mating came about as follows.

In 1781, element 42 was discovered in a lead ore. That particular mineral was known by its Latin name of "molybdaena membranacea nitens." The "molybdaena" part was taken from the Greek word "molybdenos" for lead. Despite that fact, element 42 got the name of *molybdenum*.

Element 78 is a more unusual case. It was discovered in 1748 or thereabouts somewhere in South America. It is the only element ever discovered anywhere but in Europe—including the Near East—or in the United States. It is also the only element with a name derived from the Spanish. The element is a silvery metal; the Spanish word for silver is "plata"; the element is named *platinum*.

There is a rainbow of color hidden in the names of the elements. In the first place, some of the elements are colored and this serves as inspiration. Element 17, discovered in 1774, is a yellow-green gas. The Greek word for grass-green is "chloros" so the element is named *chlorine*. It is this chlorine, by the way, that was first called "muriatic oxide" and therefore missed, for a while, as an element.

Element 53 is similar to chlorine

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chemically, but it isn't a gas. It is a slate-gray solid which, when heated, is converted into a beautiful violet vapor. The Greek word for violet is "iodes" so the element—discovered in 1811—is named *iodine*.

Iodine introduces us to the one place where the international conventions of element symbols is broken and that has come about in an odd way. The German alphabet, in its old-fashioned form—the kind that looks like Old English, only worse, with s's that look like f's and so on—does not have the letter "j." Instead, it uses the letter "i" both as a vowel and also as a consonant which is pronounced the way we pronounce "y." When German lettering is transliterated into the Latin alphabet the rest of West Europe—and America—uses, the vowel "i" is written "i," but the consonant "i," which comes only at the beginning of words, is written "j." Thus, we have "Ja" and "Johannes," pronounced, "Ya" and "Yohannes."

Very well, then, the German word for iodine is, in the Latin letters uniformly used in the German chemical literature, *Jod*, pronounced "yuhd." This is similar to part of the English pronunciation which is "ah-yuhdeen." The German symbol for iodine is "J" and in the rest of the world it is "I," but since the German "J" in Latin letters, is really "I" in their old Germanic script, the discrepancy seems forgivable to me.

After the middle of the nineteenth century, a number of elements were first detected spectro-

scopically. The color of the new spectral lines was, to begin with, the only information chemists had about the elements. For instance, elements 55 and 37 were discovered spectroscopically in 1860 and 1861 respectively. Element 55 showed a sky-blue line, element 37 a red one. The Latin word for sky-blue is "coesius" and for red is "rubidus." The elements were consequently named *cesium* and *rubidium*.

In 1861, element 81 was also discovered spectroscopically. To the discoverer, the new line appeared to be the fresh young green of a budding twig. (He obviously had a poetic soul.) The Latin word for a budding twig is "thallus," so he named the element *thallium*.

Element 49 was found to have an indigo-blue line in the spectrum so it was christened—when first observed in 1863—*indium*. The word "indigo" comes from the plant which was originally named "indicus" since it came from India. Very indirectly, then, indium is named after India, which is the only Asiatic region so honored, however indirectly.

Some elements are not themselves colored, and weren't discovered spectroscopically, yet got color-names from the fact that their compounds are colored. Take element 45, for instance. When it was discovered in 1803, it was observed that many of its compounds were rose-red in color. The Greek word for rose is "rhodon" and the element was promptly named *rhodium*.

A little more complicated is the story of elements 59 and 60, two of the rare-earth elements. All these rare-earth elements are so similar that it is hard to separate them. In 1839, elements 59 and 60 were isolated together and considered a single element. Closely associated with them was still another rare-earth element which the discoverer detected and realized to be an impurity. He thereupon called elements 59 and 60 *didymium* from the Greek word "didymos" meaning twins, because he considered his mixture the twin of the third element which he had detected and knew about. Well, I've talked about elements that were named wrongly, but here's the case of an "element" that was named correctly without the discoverer even being aware of it. Didymium was indeed twins; twin elements.

In 1885, nearly half a century later, didymium was finally separated into its two components. Element 59 formed a number of compounds which, in solution, were a blue-green color like that of leek leaves. (Leeks are a vegetable similar to the onion.) The Greeks, who have a word for everything, had one for that particular shade of green, "praseos," so element 59 was named *praseodymium*, the "leek-green twin." Element 60, with complete lack of inspiration, was named *neodymium*, the "new twin," though it was no newer than the other.

There's the rainbow: two different shades of blue—cesium and in-

dium; three different shades of green—chlorine, praseodymium, and thallium; two different shades of red—rhodium and rubidium; and one shade of violet—iodine.

To top it off, there are two elements whose compounds are of a great many different colors. These are elements 24 and 77. The word for "color" in Greek is "chroma," so when element 24 was discovered in 1798, it was called *chromium*. The Greek goddess of the rainbow is Iris and in 1804, when element 77 was discovered, it was called *iridium*.

A property of some elements more dramatic than any amount of color is radioactivity; a capacity for breaking down, giving off mysterious rays and shining eerily.

The word for "ray" is "radius" in Latin and "aktis" in Greek. Four elements are named for "ray," two by way of Greek and two by way of Latin.

The first of these is element 88, discovered in 1898 and named *radium* for the radioactive rays it emitted. Radium breaks down to a gas, element 86, which was identified in 1900 and given the same name with the non-metal ending, *radon*. (For a while, there was an alternate name for this gas, *niton*, from the Latin word "nitens," meaning "shining," but that lost out.)

Now to the Greek side of the family. Element 89 was discovered in 1899. It also gave off rays and, using the Greek, it was named *actinium*. Element 91, discovered in

1917, was bound to break down to actinium. It was actinium's parent, so to speak. It was therefore, named *protactinium* which, in Greek, means "first actinium."

Another property of radioactive elements is their instability. They break down. When element number 85 was discovered in 1940, it was named *astatine*, meaning "unstable" in Greek. (This is the element, by the way, which was erroneously reported in 1931 and called alabamine.)

Finally, the very first artificial element, that is, one manufactured in the laboratory and not found in nature, was element 43—reported, erroneously, in 1925 and named *masurium*. In 1939, it was made and given the name *technetium*, from the Greek word "technetos" meaning "artificial."

Sometimes the names of elements betray a bit of bad temper on the part of the discoverers. It is usually quite a task to isolate the suspected new element, make sure it is reasonably free of impurities and really new. The chemist might be allowed some mild swearing.

For instance, in 1839, the discoverer of element 57 called it *lanthanum*, from a Greek word meaning "to be concealed," while in 1886 element 66 was discovered and named *dysprosium* from a Greek word meaning "hard to get at."

Tantalum, which I mentioned earlier as being derived from the mythological character, Tantalus,

may also belong here, since one story of its naming—a lot depends on the source you consult as to what story you get in this as in many other things—is that the discoverer, worn out by the difficulties of isolating it, named it thus because he himself had been tantalized almost past endurance as Tantalus had been.

The inert gases of the atmosphere are present in small quantities only and are hard to separate and distinguish. In 1898, when three of them were isolated, one—element 36—was called *krypton* from a Greek word meaning "hidden" and another—element 54—was named *xenon* from a Greek word meaning "stranger." The third—element 10—with deplorable lack of imagination, was simply called *neon* from a Greek word meaning "new."

The most common of these inert gases—one which makes up fully one per cent of the atmosphere—is element 18. It was discovered in 1895. Since it was the first inert gas to be studied, chemists were struck by the fact of its inertness; that is, that it would combine with no other element. It was named *argon* from a Greek word meaning "inert" or "lazy."

(As contrast, element 51, when discovered by alchemists some time in the Middle Ages seemed unusual to them because it always appeared in combination with other elements and never alone. It was named *antimony* from Latin words meaning "against solitude." The Romans knew of a mineral that contained

antimony and they called that mineral *stibium*. As vestigial remnant of that fact, the chemical symbol of antimony is Sb.)

Two and a fraction elements are distinguished by their bad odors and their discoverers made a point of that. Element 35 is a red liquid possessed of a distinctly unpleasant smell. It was discovered in 1826 and the offended chemist involved called it *bromine* from a Greek word meaning "stench."

Element 76 has no smell of its own, but its compound with oxygen is terrible. Its discoverer, in 1804, named it *osmium*, from the Greek word for "smell."

Where does the fractional element come in? Well, oxygen under ordinary conditions forms molecules made up of two oxygen atoms apiece. That is the ordinary oxygen we breathe. Under some conditions, oxygen can arrange itself into molecules of three oxygen atoms apiece. It has different properties then. The three-oxygen molecule is poisonous and has a sharp odor—a little like bromine, perhaps. It is called *ozone*, from the same Greek word meaning "smell."

This leaves several elements with names of which nobody knows the origin. Mostly, they are the elements known since primitive times. The ancients knew nine substances that today we recognize as elements. Among them are two non-metals, elements 6 and 16. Element 6 is carbon, which I've already men-

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tioned. Element 16 is *sulfur*—German: *Schwefel*—which name, almost unchanged, can be traced back to the mists of antiquity and is lost there. An older English name is *brimstone*. This is a corruption of "brennstone," the "brenn" part being German, and presumably Anglo-Saxon, for "burn." In other words, sulfur was a "stone that burned."

The seven metals known to the ancients are elements 79, 47, 29, 26, 50, 82, and 80. Of these, element 29 is copper and element 80 is mercury. I've mentioned those. The others are: element 79, *gold* (German: *Gold*); element 47, *silver* (German: *Silber*); element 26, *iron* (German: *Eisen*); element 50, *tin* (German: *Zinn*); and element 82, *lead* (German: *Blei*). Nothing more can be said about any of those names that isn't just conjecture.

(By the way, if you wonder why I capitalized the German names of the elements, the answer is that the Germans capitalize all nouns.)

The Romans had different names for each of those metals and the Roman names are today still enshrined in the chemical symbols. I've already mentioned mercury's Hg for *hydrargyrum* and antimony's Sb for *stibium*. Well, the symbol of gold is Au (for *aurum*), that of silver is Ag (for *argentum*), that of copper is Cu (for *cuprum*), that of iron is Fe (for *ferrum*), that of tin is Sn (for *stannum*) and that of lead is Pb (for *plumbum*).

Strangely enough, one metal unknown to the ancients also manages

to have an untraceable name. The alchemists discovered element 30 and called it zinc, derivation unknown. There is a chance the name comes from some alchemical confusion of zinc and tin, the latter of which is "Zinn" in German. This is doubtful. If true, however, zinc would be another element in the list of those named after other elements, along with molybdenum and platinum.

I've now gone through all one hundred and one elements, but before quitting this little trip around the periodic table, just a word about isotopes. Most elements consist of more than one isotope—varieties of the same element differing from one another only in the number of particles in the nucleus. Ordinarily, such isotopes aren't given special names but are distinguished by numbers. Thus, uranium-235 and uranium-238 are both uranium isotopes, but one has 235 particles in the nucleus and the other 238.

However, the isotopes of hydrogen—element 1—are so different from one another in some respects

that they have been accorded separate names. There are three hydrogen isotopes, one with only one particle in the nucleus, one with two and one with three. They are called respectively *protium*, *deuterium* and *tritium*, from Greek words meaning "first," "second" and "third."

Occasionally helium—element 2—also gets special treatment. There are two helium isotopes, one with three particles in the nucleus and one with four. Helium-4 is the common variety and its nucleus is expelled from many exploding radioactive atoms. When these flying nuclei were discovered in the 1890s and before their nature was known, they were called simply *alpha rays*—"alpha" being the first letter in the Greek alphabet. (There were also beta rays and gamma rays after the second and third letters.)

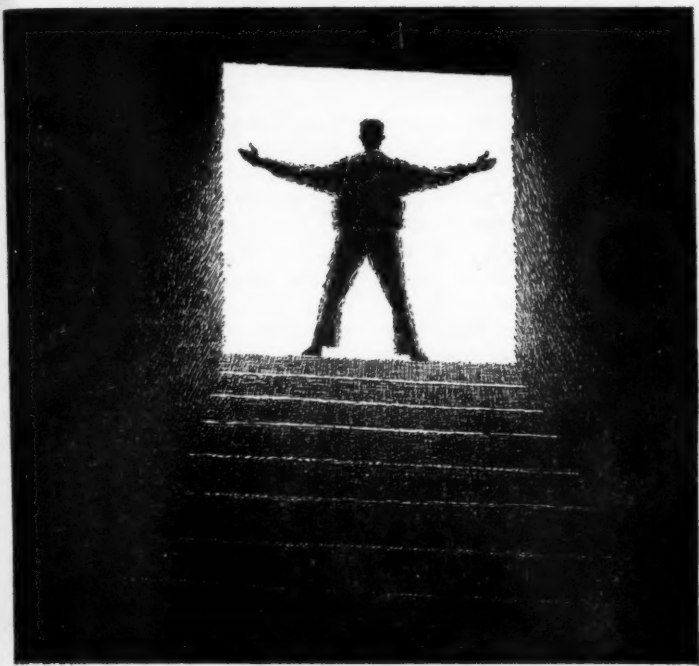
Well, helium-3 is a kind of alpha ray, so to speak, with only three particles in it, a "triple-alpha," or shortening that, and putting on the -ium ending, *tralphium*.

There, now. I'm through and, if you don't mind, I shall now lie down and catch my breath.

THE END

DEFINITION

Oxygen:—An intensely habit-forming accumulative toxic substance. As little as one breath is known to produce a life-long addiction to the gas, which addiction invariably ends in death. In high concentration, it causes death quickly, but even in a 20% dilution few survive more than 0.8 century.



THE NAKED SUN

Part Three of three. Lije Baley had a triple-decker problem to solve—and solved it only because a robot tried to give him a hand. And thereby taught him to define his terms with a new exactness!

BY ISAAC ASIMOV

Illustrated by van Dongen

SYNOPSIS

Earth is a crowded world consisting of underground Cities of enormous size. It makes use of relatively few robots. Individual Earthmen are never out in the open air and are acute agoraphobes.

Some fifty planets in the galaxy are colonized by descendants of Earthmen. The planets are the "Outer Worlds"; their inhabitants, the "Spacers." The Outer Worlds are underpopulated by Earth standards. The Spacers have wiped out disease, conquered old age and live to be three hundred. Militarily, the Outer Worlds dominate Earth. Their economy is heavily roboticized.

Of the Outer Worlds, the most extreme is Solaria. It has a population of twenty thousand humans and two hundred million robots. The humans are parceled out on large estates and make contact with one another entirely through three-dimensional images, a process they term "viewing." Direct sight of one another, which they term "seeing," is unthinkable, except in the case of man and wife, and even then, but rarely.

On Solaria, Dr. Rickain Delmarre has been murdered. His skull has been crushed by some heavy object. Solarian psychology makes it virtually impossible to suppose that anyone but his wife could have been close enough to commit the murder. His wife, Gladia Delmarre, was indeed found on the scene in a state of nervous prostration. She claimed

to have heard a shout, to have run to the spot, to have found him dead, and to have collapsed. On the scene, also, was a robot in a state of extreme disorganization, since it had witnessed a murder it could not prevent and had thus violated the first and most fundamental law of robotics. "A robot may not injure a human being, or, through inaction, allow a human being to come to harm." But there is no weapon at the scene of the murder. How was the skull-smashing done?

Solarian officials are at a loss to handle the situation. There have been no previous murders in Solarian history and virtually no crime. There are, as a consequence, no trained detectives. So Jannis Gruer, head of Solarian Security, arranges to have Earth send one of its own men, Plainclothesman Elijah Baley, to Solaria to take over the investigation.

Elijah Baley has established a reputation as a detective in a previous case in which he had worked in partnership with R. (for "Robot") Daneel Olivaw, a humanoid robot built by the Spacers of Aurora (the oldest and strongest of the Outer Worlds). When Baley lands on Solaria, he finds R. Daneel waiting for him once again. R. Daneel is sufficiently humanoid in appearance to pass as human, and the Solarians are not aware of his true nature.

Baley, a typical Earthman, is horrified at being forced into the open air and under the naked sun. Nevertheless, he makes efforts to force himself to face the open. R. Daneel,

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with robotic solicitude, tries to shield him from the open.

At the mansion built particularly for Baley and R. Daneel, Baley first interviews Jannis Gruer, and discovers and experiences the Solarian method of visual contact by image only. He next interviews Gladia Delmarre, wife of the victim and suspected murderess and learns, to his embarrassment, that the Solarians have no nudity taboo as far as "viewing" is concerned. Gladia also demonstrates a surprising interest in the planet Earth, an interest that most Spacers would scorn to have. R. Daneel, who is with Baley throughout, is convinced of Gladia's guilt and believes her behavior to be designed simply to gain Baley's sympathy.

Another interview with Jannis Gruer changes direction suddenly when Gruer, on a pretext, gets rid of R. Daneel and speaks to Baley in private. It turns out then that there is reason to think that the murder is more than just a murder but has undoubted political significance. There are underground parties on Solaria who have plans of unknown nature that will unsettle the peace of the galaxy (it is suspected). Rickain Delmarre, indicated shortly before his death that he had learned something of great importance concerning the underground but had kept the details, unfortunately, to himself, pending verification.

The danger of all this is heightened by the interstellar tensions being created. It was Aurora, for

instance, that insisted R. Daneel accompany Baley on his investigation, obviously intending to keep informed concerning events.

And as he explains this, Jannis Gruer, sipping at a drink, suddenly collapses, poisoned.

Baley instantly tries to establish the method of poisoning since no human being could possibly be on Gruer's estate at any time, due to Solarian social taboos, and since no robot—the only creatures on the scene—could possibly harm a human being. He interviews the attending robots and the human doctor who has examined the near-dead Gruer and who had earlier also examined Rickain Delmarre's body.

Baley has dinner with Gladia—by means of the "viewing" process—and implies he knows the method by which Gruer might have been poisoned, and that a human need not have been on the scene to manage the poisoning. Gladia concludes he is accusing her of the poisoning as well as of the original murder and in a burst of anger breaks off viewing contact.

That night, Baley dreams of being back on Earth, safe in the underground City, and yet the naked sun shines down through all the layers of concrete and steel so that sunlight blazes on him. On waking, he determines that only by actually seeing Solarians can he gain the information he needs. Viewing is not enough. R. Daneel, however, is determined not to allow Baley to

expose himself, not only for the psychological trauma that would result, but because of actual danger that Baley might be murdered in his turn.

Ignoring this, Baley first bluffs Corwin Attlebish—Acting Head of Security during Gruer's illness—into permitting the detective to "see" Solarians. He next tricks R. Daneel into exposing his robotic nature in the sight of several Solarian robots. The robots, who will obey only humans, promptly put R. Daneel under arrest at Baley's orders.

Baley now interviews Anselmo Quemot, Solaria's only sociologist, in order to learn more about Solarian society. He is disappointed to find out that Solarian sociology in contrast with Terrestrial sociology, is extremely primitive.

He then travels to Rickain Delmarre's professional offices, which he finds to be a "farm" at which Solarian children are brought up from early fetus-hood, through "birth," to adolescence. They are gradually accustomed to isolation and introduced to "viewing." (Throughout his travels, Baley battles desperately with his fear of the open.)

In charge of the farm since Delmarre's death is his erstwhile assistant, Kloitta Cantoro—a female. She takes Baley on a tour of the farm, uncomfortable at having him at seeing distance, but somewhat inured to it through the necessity of close

contact with the children of whom she is in charge.

While Baley is watching youngsters at play, he is shot at by one of them with a bow and arrow. The arrow barely misses. Kloitta is angry at this piece of insolence induced, apparently, by the youngster having been informed by an attendant robot that Baley was only an Earthman.

To Baley it seems much more than insolence. He suspects this to be still another case of attempted murder and announces the arrow to have been poisoned.

PART 3

XIII

Kloitta said, "Impossible! Skies above, absolutely impossible!"

"Above or below or any way you wish it. Is there an animal on the farm that's expendable? Get it and scratch it with the arrow and see what happens."

"But why should anyone want to—"

Baley said harshly, "I know why. The question is, who?"

"No one."

Baley felt the dizziness returning and he grew savage. He threw the arrow at her and she eyed the spot where it fell.

"Pick it up," Baley cried, "and if you don't want to test it, destroy it. Leave it there and you'll have an accident if the children get at it."

She picked it up hurriedly, hold-

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ing it between forefinger and thumb.

Baley ran for the nearest entrance to the building and Kloitta was still holding the arrow, gingerly, when she followed him back indoors.

Baley felt a certain measure of equanimity return with the comfort of enclosure. He said, "Who poisoned the arrow?"

"I can't imagine."

"I suppose it isn't likely the boy did it himself. Would you have any way of telling who his parents were?"

"We could check the records," said Kloitta, gloomily.

"Then you do keep records of relationships?"

"We have to for gene analysis."

"Would the youngster know who his parents were?"

"Never," said Kloitta, energetically.

"Would he have any way of finding out?"

"He would have to break into the records room. Impossible."

"Suppose an adult visited the estate and wanted to know who his child was—"

Kloitta flushed. "Very unlikely."

"But suppose. Would he be told if he were to ask?"

"I don't know. It isn't exactly illegal for him to know. It certainly isn't customary."

"Would you tell him?"

"I'd try not to. I know Dr. Delmarre wouldn't have. He believed knowledge of relationship was for gene analysis only. Before him

things may have been looser. Why do you ask all this, anyway?"

"I don't see how the youngster could have a motive on his own account. I thought that through his parents he might have."

"This is all horrible." In her disturbed state of mind, Kloitta approached more closely than at any previous time. She even stretched out an arm in his direction. "How can it all be happening? The boss killed; you nearly killed. We have no motives for violence on Solaria. We all have all we can want, so there is no personal ambition. We have no knowledge of relationship, so there is no family ambition. We are all in good genic health."

Her face cleared all at once. "Wait. This arrow can't be poisoned. I shouldn't let you convince me it is."

"Why have you suddenly decided that?"

"The robot with Bik. He would never have allowed poison. It's inconceivable that he could have done anything that might bring harm to a human being. The First Law of Robotics makes sure of that."

Baley said, "Does it? What is the First Law, I wonder?"

He might as well have asked—as another did on a certain occasion—What is truth?

Kloitta stared blankly, "What do you mean?"

"Nothing. You have the arrow tested and you will find it poisoned." Baley himself was scarcely interested in the matter. He knew it for poi-

son beyond any internal questionings. He said, "Do you still believe Mrs. Delmarre to have been guilty of her husband's death?"

"She was the only one present."

"I see. And you are the only other human adult present on this estate at a time when I have just been shot at with a poison arrow."

She cried energetically, "I had nothing to do with it."

"Perhaps not. And perhaps Mrs. Delmarre is innocent as well. May I use your viewing apparatus?"

"Yes, of course."

Baley knew exactly whom it was he intended to view and it was *not* Gladia. It came as a surprise to himself then to hear his voice say, "Get Gladia Delmarre."

The robot obeyed without comment, and Baley watched the manipulations with astonishment, wondering why he had given the order.

Was it that the girl had just been the subject of discussion, or was it that he had been a little disturbed over the manner of the end of their last viewing, or was it simply the sight of the husky, almost overpoweringly practical figure of Kloitta that finally enforced the necessity of a glimpse of Gladia as a kind of counter-irritant?

He thought, defensively: Jehoshaphat! Sometimes a man has to play things by ear.

She was there before him all at once, sitting in a large upright chair that made her appear smaller and

more defenseless than ever. Her hair was drawn back and bound into a loose coil. She wore earrings pendant, bearing gems that looked like diamonds. Her dress was a simple affair that clung tightly at the waist.

She said in a low voice, "I'm glad you viewed, Elijah. I've been trying to reach you."

"Good morning, Gladia." (Afternoon? evening? He didn't know Gladia's time and he couldn't tell from the manner in which she was dressed what time it might be.) "Why have you been trying to reach me?"

"To tell you I was sorry I had lost my temper last time we viewed. Mr. Olivaw didn't know where you were to be reached."

Baley had a momentary vision of Daneel still bound fast by the over-seeing robots and almost smiled. He said, "That's all right. In a few hours, I'll be seeing you."

"Of course, if— *Seeing* me?"

"Personal presence," said Baley, gravely.

Her eyes grew wide and her hands, which were resting on the arms of her chair, sprouted sudden clutching fingers, digging into the smooth plastic. "Is there any reason for that?"

"It is necessary."

"I don't think—"

"Would you allow it?"

She looked away, "Is it absolutely necessary?"

"It is. First, though, there is someone else I must see. Your hus-

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band was interested in robots. You told me that, and I have heard it from other sources, but he wasn't a roboticist, was he?"

"That wasn't his training, Elijah." She still avoided his eyes.

"But he worked with a roboticist, didn't he?"

"Jothan Leebig," she said at once. "He's a good friend of mine."

"He is?" said Baley, energetically.

Gladia looked startled. "Shouldn't I have said that?"

"Why not, if it's the truth?"

"I'm always afraid that I'll say things that will make me seem as though— You don't know what it's like when everyone is sure you've done something."

"Take it easy. How is it that Leebig is a friend of yours?"

"Oh, I don't know. He's on the next estate for one thing. Viewing energy is just about nil, so we can just view all the time in free motion with hardly any trouble. We go on walks together all the time, or we did, anyway."

"I didn't know you could go on walks together with anyone."

Gladia flushed. "I said *viewing*. Oh, well, I keep forgetting you're an Earthman. Viewing in free motion means we focus on ourselves and we can go anywhere we want to without losing contact. I walk on my estate and he walks on his and we're together." She held her chin high. "It can be pleasant."

Then, suddenly, she giggled. "Poor Jothan."

"Why do you say that?"

"I was thinking of you thinking we walked together without viewing. He'd die if he thought anyone could think that."

"Why?"

"He's terrible that way. He told me that when he was five years old he stopped seeing people. Insisted on viewing only. Some children are like that. Rickain"—she paused in confusion, then went on—"Rickain, my husband, once told me when I talked about Jothan, that more and more children would be like that, too. He said it was a kind of social evolution that favored survival of pro-viewing. Do you think that's so?"

"I'm no authority," said Baley.

"Jothan won't even get married. Rickain was angry with him, told him he was antisocial and that he had genes that were necessary in the common pool, but Jothan just refused to consider it."

"Has he a right to refuse?"

"No-o," said Gladia, hesitantly, "but he's a very brilliant roboticist, you know, and roboticists are valuable on Solaria. I suppose they stretched a point. Except I think Rickain was going to stop working with Jothan. He told me once Jothan was a bad Solarian."

"Did he tell Jothan that?"

"I don't know. He was working with Jothan to the end."

"But he thought Jothan was a bad Solarian for refusing to marry?"

"Rickain once said that marriage

was the hardest thing in life, but that it had to be endured."

"What did you think?"

"About what, Elijah?"

"About marriage. Did you think it was the hardest thing in life?"

Her expression grew slowly blank as though she were painstakingly washing emotion out of it. She said, "I never thought about it."

Baley said, "You said you go on walks with Jothan Leebig all the time, then corrected yourself and put that in the past. You don't go on walks with him any more, then?"

Gladia shook her head. Expression was back in her face. Sadness. "No. We don't seem to. I viewed him once or twice. He always seemed busy and I didn't like to— You know."

"Was this since the death of your husband?"

"No, even some time before. Several months before."

"Do you suppose Dr. Delmarre ordered him not to pay further attention to you?"

Gladia looked startled. "Why should he? Jothan isn't a robot and neither am I. How can we take orders and why should Rickain give them?"

Baley did not bother to try to explain. He could have done so only in Earth terms and that would make things no clearer to her. And if it did manage to clarify, the result could only be disgusting to her.

Baley said, "Only a question. I'll

view you again, Gladia, when I'm done with Leebig. What time do you have, by the way?" He was sorry at once for asking the question. Robots would answer in Terrestrial equivalents but Gladia might answer in Solarian units and Baley was weary to death of displaying ignorance.

But Gladia answered in purely qualitative terms. "Mid-afternoon," she said.

"Then that's it for Leebig's estate also?"

"Oh, yes."

"Good. I'll view you again as soon as I can and we'll make arrangements for seeing."

Again she grew hesitant. "Is it absolutely necessary?"

"It is."

She said in a low voice, "Very well."

There was some delay in contacting Leebig and Baley utilized it in consuming another sandwich, one that was brought to him in its original packaging. But he had grown more cautious. He inspected the seal carefully before breaking it, then looked over the contents painstakingly by eye and nose.

He accepted a plastic container of milk, not quite unfrozen, bit an opening with his own teeth and drank from it directly. He thought gloomily that there were such things as odorless, tasteless, slow-acting poisons that could be introduced delicately by means of hypodermic needles or high-pressure needle-jets,

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then put the thought aside as being childish.

So far, murders and attempted murders had been committed in the most direct possible fashion. There was nothing delicate or subtle about a blow on the head, enough poison in a glass to kill a dozen men, or a poisoned arrow shot openly at the victim.

And then he thought, scarcely less gloomily, that as long as he hopped between time zones in this fashion, he was scarcely likely to have regular meals. Or, if this continued, regular sleep.

The robot approached him. "Dr. Leebig directs you to call some time tomorrow. He is engaged in important work."

Baley bounced to his feet and roared, "You tell that guy—"

He stopped. There was no use in yelling at a robot. That is, you could yell if you wished, but it would achieve results no sooner than a whisper.

He said, in a conversational tone, "You tell Dr. Leebig, or his robot if that is as far as you've reached, that I am investigating the murder of a professional associate of his and a good Solarian. You tell him that I cannot wait on his work. You tell him that if I am not viewing him in five minutes, I will be in a plane and at his estate *seeing* him in less than an hour. You use that word, *seeing*, so there's no mistake."

He returned to his sandwich.

The five minutes were not quite gone, when Leebig, or at least a

Solarian whom Baley presumed to be Leebig, was glaring at him.

Baley glared back. Leebig was a lean man, who held himself rigidly erect. His dark, prominent eyes had a look of intense abstraction about them, compounded now with anger. One of his eyelids drooped slightly.

He said, "Are you the Earthman?"

"Elijah Baley," said Baley, "Plainclothesman C-6, in charge of the investigation into the murder of Dr. Rickain Delmarre. What is your name?"

"I'm Dr. Jothan Leebig. Why do you presume to annoy me at my work?"

"It's easy," said Baley, quietly. "It's my business."

"Then take your business elsewhere."

"I have a few questions to ask first, doctor. I believe you were a close associate of Dr. Delmarre. Right?"

One of Leebig's hands clenched suddenly into a fist and he strode hastily toward a mantelpiece on which tiny clockwork contraptions went through complicated periodic motions that caught hypnotically at the eye.

The viewer kept focused on Leebig so that his figure did not depart from central projection as he walked. Rather, the room behind him seemed to move backward in little rises and dips as he strode.

Leebig said, "If you are the foreigner whom Gruer threatened to bring in—"



"I am."

"Then you are here against my advice. Done viewing."

"Not yet. Don't break contact." Baley raised his voice sharply and a finger as well. He pointed it directly at the roboticist, who shrank visibly away from it, full lips spreading into an expression of disgust.

Baley said, "I wasn't bluffing about seeing you, you know."

"No Earthman vulgarity, please."

"A straightforward statement is what it is intended to be. I will see you, if I can't make you listen any other way. I will grab you by the collar and make you listen."

Leebig stared back. "You are a filthy animal."

"Have it your way, but I will do as I say."

"If you try to invade my estate, I will . . . I will—"

Baley lifted his eyebrows. "Kill me? Do you often make such threats?"

"I made no threat."

"Then talk now. In the time you have wasted, a good deal might have been accomplished. You were a close associate of Dr. Delmarre. Right?"

The roboticist's head lowered. His shoulders moved slightly to a slow, regular breathing. When he looked up, he was in command of himself. He even managed a brief, sapless smile.

"I was."

"Delmarre was interested in new types of robots, I understand."

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"He was."

"What kind?"

"Are you a roboticist?"

"No. Explain it for the layman."

"I doubt that I can."

"Try! For instance, I think he wanted robots capable of disciplining children. What would that involve?"

Leebig raised his eyebrows briefly and said, "To put it very simply, skipping all the subtle details, it means a strengthening of the C-integral governing the Sikorovich tandem route response at the W-65 level."

"Double-talk," said Baley.

"The truth."

"It's double-talk to me. How else can you put it?"

"It means a certain weakening of the First Law."

"Why so? A child is disciplined for its own future good. Isn't that the theory?"

"Ah, the future good!" Leebig's eyes glowed with passion and he seemed to grow less conscious of his listener and correspondingly more talkative. "A simple concept, you think. How many human beings are willing to accept a trifling inconvenience for the sake of a large future good? How long does it take to train a child that what tastes good now means a stomach-ache later, and what tastes bad now will correct the stomach-ache later. Yet you want a robot to be able to understand?"

"Pain inflicted by a robot on a child sets up a powerful disruptive

potential in the positronic brain. To counteract that by an antipotential triggered through a realization of future good requires enough paths and bypaths to increase the mass of the positronic brain by fifty per cent, unless other circuits are sacrificed."

Baley said, "Then you haven't succeeded in building such a robot."

"No, nor am I likely to succeed. Nor anyone."

"Was Dr. Delmarre testing an experimental model of such a robot at the time of his death?"

"Not of *such* a robot. We were interested in other more practical things also."

Baley said, quietly, "Dr. Leebig, I am going to have to learn a bit more about robotics and I am going to ask you to teach me."

Leebig shook his head violently, and his drooping eyelid dipped further in a ghastly travesty of a wink. "It should be obvious that a course in robotics takes more than a moment. I lack the time."

"Nevertheless, you must teach me. The smell of robots is the one thing that pervades everything on Solaria. If it is time we require, then I must see you more than ever. I am an Earthman and I cannot work or think comfortably while viewing."

It would not have seemed possible to Baley for Leebig to stiffen his stiff carriage further, but he did. He said, "Your phobias as an Earthman don't concern me. Seeing is impossible."

"I think you will change your mind when I tell you what I chiefly want to consult you about."

"It will make no difference. Nothing can."

"No? Then listen to this. It is my belief that throughout the history of the positronic robot, the First Law of Robotics has been deliberately misquoted."

Leebig moved spasmodically. "Misquoted? Fool! Madman! Why?"

"To hide the fact," said Baley, with complete composure, "that robots can commit murder."

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Leebig's mouth widened slowly. Baley took it for a snarl at first and then, with considerable surprise, decided that it was the most unsuccessful attempt at a smile that he had ever seen.

Leebig said, "Don't say that. Don't ever say that."

"Why not?"

"Because anything, however small, that encourages distrust of robots is harmful. Distrusting robots is a human *disease*!"

It was as though he were lecturing a small child. It was as though he were saying something gently that he wanted to yell. It was as though he were trying to persuade when what he really wanted was to enforce on penalty of death.

Leebig said, "Do you know the history of robotics?"

"A little."

"On Earth, you should. Yes. Do you know robots started with a Frankenstein complex against them? They were suspect. Men distrusted and feared robots. Robotics was almost an undercover science as a result. The Three Laws were first built into robots in an effort to overcome distrust and even so Earth would never allow a robotic society to develop. One of the reasons the first pioneers left Earth to colonize the rest of the galaxy was so that they might establish societies in which robots would be allowed to free men of poverty and toil. Even *then*, there remained a latent suspicion not far below, ready to pop up at any excuse."

"Have you yourself had to counter distrust of robots?" asked Baley.

"Many times," said Leebig, grimly.

"Is that why you and other roboticists are willing to distort the facts just a little in order to avoid suspicion as much as possible?"

"There is no distortion!"

"For instance, aren't the Three Laws misquoted?"

"No!"

"I can demonstrate that they are, and unless you convince me otherwise, I will demonstrate it to the whole galaxy, if I can."

"You're mad. Whatever argument you may think you have is fallacious, I assure you."

"Shall we discuss it?"

"If it does not take too long."

"Face to face? Seeing?"

Leebig's thin face twisted. "No!"

"Good-by, Dr. Leebig. Others will listen to me."

"Wait!"

"Seeing?"

The roboticist's hands wandered upward, hovered about his chin. Slowly a thumb crept into his mouth and remained there. He stared, blankly, at Baley.

Baley thought: Is he regressing to the pre-five-year-old stage so that it will be legitimate for him to see me.

"Seeing?" he said.

But Leebig shook his head slowly. "I can't. I can't." He moaned, the words all but stifled by the blocking thumb. "Do whatever you want."

Baley stared at the other and watched him turn away and face the wall. He watched the Solarian's straight back bend and the Solarian's face hide in shaking hands.

Baley said, "Very well, then, I'll agree to view."

Leebig said, back still turned, "Excuse me a moment. I'll be back."

Baley tended to his own needs during the interval and stared at his fresh-washed face in the bathroom mirror. Was he getting the feel of Solaria and Solarians? He wasn't sure.

He sighed and pushed a contact and a robot appeared. He didn't turn to look at it. He said, "Is there another viewer at the farm, besides the one I'm using?"

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"There are three other outlets, master."

"Then tell Kloitta Cantoro . . . tell your mistress, I will be using this one till further notice and that I am not to be disturbed."

"Yes, master."

Baley returned to his position where the viewer remained focused on the empty patch of room in which Leebig had stood. It was still empty and he settled himself to wait.

It wasn't long. Leebig entered and the room once more jiggled as the man walked. Evidently, focus shifted from room-center to man-center without delay. Baley remembered the complexity of viewing-controls and began to feel a kind of appreciation of what was involved.

Leebig was quite master of himself now, apparently. His hair was slicked back and his costume had been changed. His clothes fitted loosely and were of a material that glistened and caught highlights. He sat down in a slim chair that folded out of the wall.

He said, soberly, "Now what is this notion of yours concerning First Law?"

"Will we be overheard?"

"No. I've taken care."

Baley nodded. He said, "Let me quote the First Law."

"I scarcely need that."

"I know, but let me quote it, anyway: A robot may not harm a human being nor, through inaction, allow a human being to come to harm."

"Well?"

"Now when I first landed on Solaria, I was driven to the estate assigned for my use in a ground car. The ground car was a specially enclosed job designed to protect me from exposure to open space. As an Earthman—"

"I know about that," said Leebig, impatiently. "What has this to do with the matter?"

"The robots who drove the car did *not* know about it. I asked that the car be opened and was at once obeyed. Second Law. They had to follow orders. I was uncomfortable, of course, and nearly collapsed before the car was enclosed again. Didn't the robots harm me?"

"At your order," snapped Leebig.

"I'll quote the Second Law: A robot must obey the orders given it by human beings except where such orders would conflict with the First Law. So you see, my order should have been ignored."

"This is nonsense. The robot lacked knowledge—"

Baley leaned forward in his chair. "Ah! We have it. Now let's recite the First Law as it should be stated: A robot may do nothing which, *to its knowledge*, will harm a human being; nor, through inaction, *knowingly* allow a human being to come to harm."

"This is all understood."

"I think, not by ordinary men. Otherwise, ordinary men would realize robots could commit murder."

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Leebig was white. "Mad! Lunacy!"

Baley stared at his finger-ends. "A robot may perform an innocent task, I suppose; one which has no damaging effect on a human being?"

"If ordered to do so," said Leebig.

"Yes, of course. If ordered to do so. And a second robot may perform an innocent task, also, I suppose; one which also can have no damaging effect on a human being? If ordered to do so?"

"Yes."

"And what if the two innocent tasks, each completely innocent, completely, amount to murder when added together?"

"What?" Leebig's face puckered into a scowl.

"I want your expert opinion on the matter," said Baley. "I'll set you a hypothetical case. Suppose a man says to a robot, 'Place a small quantity of this liquid into a glass of milk that you will find in such and such a place. The liquid is harmless. I wish only to know its effect on milk. Once I know the effect, the mixture will be poured out. After you have performed this action, forget you have done so.'"

Leebig, still scowling, said nothing.

Baley said, "If I had told the robot to add a mysterious liquid to milk and then offer it to a man, First Law would force it to ask, 'What is the nature of the liquid?"

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Will it harm a man? And if he were assured the liquid were harmless, First Law might still make the robot hesitate and refuse to offer the milk. Instead, however, he is told the milk will be poured out. First Law is not involved. Won't the robot do as it is told?"

Leebig glared.

Baley said, "Now a second robot has poured out the milk in the first place and is unaware that the milk has been tampered with. In all innocence, it offers the milk to a man and the man dies."

Leebig cried out, "No!"

"Why not? Both actions are innocent in themselves. Only together are they murder. Do you deny that that sort of thing can happen?"

"The murderer would be the man who gave the order," cried Leebig.

"If you want to be philosophical, yes. The robots would have been the immediate murderers, though, the instruments of murder."

"No man would give such orders."

"A man would. A man has. It was exactly in this way that the murder attempt on Dr. Gruer must have been carried through. You've heard about that, I suppose."

"On Solaria," muttered Leebig, "one hears about everything."

"Then you know Gruer was poisoned at his dinner table before the eyes of myself and my partner, Mr. Olivaw of Aurora. Can you suggest any other way in which the poison might have reached him? There was no other human on the estate. As

a Solarian, you must appreciate that point."

"I'm not a detective. I have no theories."

"I've presented you with one. I want to know if it is a possible one. I want to know if two robots might not perform two separate actions, each one innocent in itself, the two together resulting in murder. You're the expert, Dr. Leebig. *Is it possible?*"

And Leebig, haunted and harried, said, "Yes," in a voice so low that Baley scarcely heard him.

Baley said, "Very well, then. So much for the First Law."

Leebig stared at Baley and his drooping eyelid winked once or twice in a slow tic. His hands, which had been clasped, drew apart, though the fingers maintained their clawed shape as though each hand still entwined a phantom hand of air. Palms turned downward and rested on knees and only then did the fingers relax.

Baley watched it all in abstraction.

Leebig said, "Theoretically, yes. Theoretically! But don't dismiss the First Law that easily, Earthman. Robots would have to be ordered very cleverly in order to circumvent the First Law."

"Granted," said Baley. "I am only an Earthman. I know next to nothing about robots and my phrasing of the orders was only by way of example. A Solarian would be much more subtle and do much better, I'm sure of that."

Leebig might not have been listen-

ing. He said, loudly, "If a robot can be manipulated into doing harm to a man, it means only that we must extend the powers of the positronic brain. One *might* say we ought to make the human better. That is impossible, so we will make the robot more foolproof.

"We advance continuously. Our robots are more varied, more specialized, more capable, and more unharmed than those of a century ago. A century hence, we will have still greater advances. Why have a robot manipulate controls when a positronic brain can be built into the controls itself? That's specialization, but we can generalize, also. Why not a robot with replaceable and interchangeable limbs. Eh? Why not? If we—"

Baley interrupted. "Are you the only roboticist on Solaria?"

"Don't be a fool."

"I only wondered. Dr. Delmarre was the only . . . uh . . . fetal engineer, except for an assistant."

"Solaria has over twenty roboticists."

"Are you the best?"

"I am," Leebig said it without self-consciousness.

"Delmarre worked with you."

"He did."

Baley said, "I understand that he was planning to break the partnership toward the end."

"No sign of it. What gave you the idea?"

"I understand he disapproved of your bachelorhood."

"He may have. He was a thor-

ough Solarian. However, it did not affect our business relationships."

"To change the subject. In addition to developing new model robots, do you also manufacture and repair existing types?"

Leebig said, "Manufacture and repair are largely robot-conducted. There is a large factory and maintenance shop on my estate."

"Do robots require much in the way of repair, by the way?"

"Very little."

"Does that mean that robot-repair is an undeveloped science?"

"Not at all." Leebig said that, stiffly.

"What about the robot that was at the scene of Dr. Delmarre's murder?"

Leebig looked away, and his eyebrows drew together as though a painful thought were being barred entrance to his mind. "It was a complete loss."

"Really complete? Could it answer any questions at all?"

"None at all. It was absolutely useless. Its positronic brain was completely short-circuited. Not one pathway was left intact. Consider! It had witnessed a murder it had been unable to halt—"

"Why was it unable to halt the murder, by the way?"

"Who can tell? Dr. Delmarre was experimenting with that robot. I do not know in what mental condition he had left it. He might have ordered it, for instance, to suspend all operations while he checked one

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particular circuit element. If someone whom neither Dr. Delmarre nor the robot suspected of harm were suddenly to launch a homicidal attack, there might be a perceptible interval before the robot could use First Law potential to overcome Dr. Delmarre's freezing order. The length of the interval would depend on the nature of the attack and the nature of Dr. Delmarre's freezing order. I could invent a dozen other ways of explaining why the robot was unable to prevent the murder. Being unable to do so was a First Law violation, however, and that was sufficient to blast every positronic pathway in the robot's mind."

"But if the robot was physically unable to prevent the murder, was it responsible? Does the First Law ask impossibilities?"

Leebig shrugged. "The First Law, despite your attempts to make little of it, protects humanity with every atom of possible force. It allows no excuses. If the First Law is broken, the robot is ruined."

"That is a universal rule, sir?"

"As universal as robots."

Baley said, "Then I've learned something."

"Then learn something else. Your theory of murder by a series of robotic actions, each innocent in itself, will not help you in the case of Delmarre's death."

"Why not?"

"The death was not by poisoning, but by bludgeoning. Something had to hold the bludgeon, and that had

to be a human arm. No robot could swing a club and smash a skull."

"Suppose," said Baley, "a robot were to push an innocent button which dropped a booby-trap weight on Delmarre's head."

Leebig smiled sourly. "Earthman, I've viewed the scene of the crime. I've heard all the news. The murder was a big thing here on Solaria, you know. So I know there was no sign of any machinery at the scene of the crime, or of any fallen weight."

Baley said, "Or of any blunt instrument, either."

Leebig said, scornfully, "You're a detective. Find it."

"Granting that a robot was not responsible for Dr. Delmarre's death, who was, then?"

"Everyone knows who was," shouted Leebig. "His wife! Gladia!"

Baley thought: *At least there's a unanimity of opinion.*

Aloud, he said, "And who was the mastermind behind the robots who poisoned Gruer?"

"I suppose—" Leebig trailed off.

"You don't think there are two murderers, do you? If Gladia was responsible for one crime, she must be responsible for the second attempt, also."

"Yes. You must be right." His voice gained assurance. "No doubt of it."

"No doubt?"

"Nobody else could get close enough to Dr. Delmarre to kill him. He allowed personal presence

no more than I did, except that he made an exception in favor of his wife, and I make no exceptions. The wiser I." The roboticist laughed harshly.

"I believe you knew her," said Baley, abruptly.

"Whom?"

"Her. We are discussing only one 'her.' Gladia!"

"Who told you I knew her any more than I know anyone else?" demanded Leebig. He put his hand to his throat. His fingers wriggled slightly and a seam opened for an inch downward, leaving more space to breathe.

"Gladia herself did. You two went for walks."

"So? We were neighbors. It is a common thing to do. She seemed a pleasant person."

"You approved of her, then?"

Leebig shrugged. "Talking to her was relaxing."

"What did you talk about?"

"Robotics." There was a flavor of surprise about the word as though there were wonder that the question could be asked.

"And she talked robotics, too?"

"She knew nothing about robotics. Ignorant! But she listened. She has some sort of field-force rigmarole she plays with; field-coloring, she calls it. I have no patience with that, but I listened."

"All this without personal presence?"

Leebig looked revolted and did not answer.

Baley tried again, "Were you attracted to her?"

"What?"

"Did you find her attractive? Physically?"

Even Leebig's bad eyelid lifted and his lips quivered. "Filthy animal," he muttered.

"Let me put it this way, then. When did you cease finding Gladia pleasant? You used that word yourself, if you remember."

"What do you mean?"

"You said you found her pleasant. Now you believe she murdered her husband. That isn't the mark of a pleasant person."

"I was mistaken about her."

"But you decided you were mistaken before she killed her husband, if she did so. You stopped walking with her some time before the murder. Why?"

Leebig said, "Is that important?"

"Everything is important till proven otherwise."

"Look, if you want information from me as a roboticist, ask it. I won't answer personal questions."

Baley said, "You were closely associated with both the murdered man and the chief suspect. Don't you see that personal questions are unavoidable? Why did you stop walking with Gladia?"

Leebig snapped, "There came a time when I ran out of things to say; when I was too busy; when I found no reason to continue the walks."

"When you no longer found her pleasant, in other words."

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"All right. Put it so."

"Why was she no longer pleasant?"

Leebig shouted, "I have no reason."

Baley ignored the other's excitement. "You are still someone who has known Gladia well. What could her motive be?"

"Her motive?"

"No one has suggested any motive for the murder. Surely Gladia wouldn't commit murder without a motive."

Leebig leaned his head back as though to laugh, but didn't. "No one told you? Well, perhaps no one knew. I knew, though. She told me. She told me frequently."

"Told you what, Dr. Leebig?"

"Why, that she quarreled with her husband. Quarreled bitterly and frequently. She hated him, Earthman. Didn't anyone tell you that? Didn't *she* tell you?"

XV

Baley took it between the eyes and tried not to show it.

Presumably, living as they did, Solarians considered one another's private lives to be sacrosanct. Questions concerning marriage and children were in bad taste. He supposed then that chronic quarreling could exist between husband and wife and be a matter into which curiosity was equally forbidden.

But even when murder had been committed? Would no one commit the social crime of asking the sus-

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pect if she quarreled with her husband? Or of mentioning the matter if they happened to know of it?

Well, Leebig had.

Baley said, "What did the quarrels concern?"

"You had better ask her, I think."

He better had, thought Baley. He rose stiffly, "Thank you, Dr. Leebig, for your co-operation. I may need your help again later. I hope you will keep yourself available."

"Done viewing," said Leebig, and he and his segment of his room vanished abruptly.

For the first time, Baley found himself not minding a plane-flight through open space. Not minding it at all. It was almost as though he were in his own element.

He wasn't even thinking of Earth or of Jessie. He had been away from Earth only a matter of weeks, yet it might as well have been years. He had been on Solaria only the better part of three days and yet it seemed forever.

How fast could a man adapt to nightmare?

Or was it Gladia? He would be seeing her soon, not viewing her. Was that what gave him confidence and this odd feeling of mixed apprehension and anticipation?

Would she endure it, he wondered. Or would she slip away after a few moments of seeing, begging off as Quemot had done?

She stood at the other end of a long room when he entered. She

might almost have been an impressionistic representation of herself, she was reduced so to essentials.

Her lips were faintly red, her eyebrows lightly penciled, her earlobes faintly blue and, except for that, her face was untouched. She looked pale, a little frightened, and very young.

Her brown-blond hair was drawn back, and her blue-green eyes were somehow shy. Her dress was a blue so dark as to be almost black, with a thin white edging curling down each side. She wore long sleeves, white gloves and flat-heeled shoes. Not an inch of skin showed anywhere but in her face. Even her neck was covered by a kind of unobtrusive ruching.

Baley stopped where he was. "Is this close enough, Gladia?"

She was breathing with shallow quickness. She said, "I didn't know what to expect really. It's just like viewing, isn't it? I mean, if you don't think of it as seeing."

Baley said, "It's all quite normal to me."

"Yes, on Earth." She closed her eyes. "Sometimes I try to imagine it. Just crowds of people everywhere. You walk down a road and there are others walking with you and still others walking in the other direction. Dozens—"

"Hundreds," said Baley. "Did you ever view scenes on Earth in a book-film? Or view a novel with an Earth setting?"

"We don't have many of those, but I've viewed novels set on the

other Outer Worlds where seeing goes on all the time. It's different in a novel. It just seems like a multi-view."

"Do people ever kiss in novels?"

She flushed painfully. "I don't read that kind."

"Never?"

"Well— There are always a few dirty films around, you know, and sometimes, just out of curiosity— It's sickening, really."

"Is it?"

She said, with sudden animation, "But Earth is so different. So many people. When you walk, Elijah, I suppose you even t-touch people. I mean, by accident."

Baley half-smiled. "You even knock them down by accident." He thought of the crowds on the Expressways, tugging and shoving, bounding up and down the strips, and for a moment, inevitably, he felt the pang of homesickness.

Gladia said, "You don't have to stay way out there."

"Would it be all right if I came closer?"

"I think so. I'll tell you when I'd rather you wouldn't any more."

Stepwise, Baley drew closer, while Gladia watched him, wide-eyed.

She said, suddenly, "Would you like to see some of my field-colorings?"

Baley was six feet away. He stopped and looked at her. She seemed small and fragile. He tried to visualize her, something in her hand (what?), swinging furiously at the skull of her husband. He

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tried to picture her, mad with rage, homicidal with hate and anger.

He had to admit it could be done. Even a hundred and five pounds of woman could crush a skull if she had the proper weapon and were wild enough. And Baley had known murderesses—on Earth, of course—who, in repose, were bunny-rabbits.

He said, "What are field-colorings, Gladia?"

"An art form," she said.

Baley remembered Leebig's reference to Gladia's art. He nodded. "I'd like to see some."

"Follow me, then."

Baley maintained a careful six-foot distance between them. At that, it was less than a third the distance Kloitta had demanded.

They entered a room that burst with light. It glowed in every corner and every color.

Gladia looked pleased, proprietary. She looked up at Baley, eyes anticipating.

Baley's response must have been what she expected, though he said nothing. He turned slowly, trying to make out what he saw, for it

was light only, no material object at all.

The gobbets of light sat on embracing pedestals. They were living geometry, lines and curves of color, entwined into a coalescing whole yet maintaining distinct identities. No two specimens were even remotely alike.

Baley groped for appropriate words and said, "Is it supposed to mean anything?"

Gladia laughed in her pleasant contralto. "It means whatever you like it to mean. They're just light-forms that might make you feel angry or happy or curious or whatever I felt when I constructed one. I could make one for you, a kind of portrait. It might not be very good, though, because I would just be improvising quickly."

"Would you? I would be very interested."

"All right," she said, and half-ran to a light-figure in one corner, passing within inches of him as she did so. She did not seem to notice.

She touched something on the pedestal of the light-figure and the glory above died without a flicker.

Baley gasped and said, "Don't do that."

"It's all right. I was tired of it, anyway. I'll just fade the others temporarily so they don't distract me." She opened a panel along one featureless wall and moved a rheostat. The colors faded to something scarcely visible.

Baley said, "Don't you have a

robot to do this? Closing contracts?"

"*Shush*, now," she said, impatiently. "I don't keep robots in here. This is *me*." She looked at him, frowning. "I don't know you well enough. That's the trouble."

She wasn't looking at the pedestal, but her fingers rested lightly on its smooth upper surface. All ten fingers were partly curved, tense, waiting.

One finger moved, describing a half-curve over smoothness. A bar of deep yellow light grew and slanted obliquely across the air above. The finger inched backward a fraction and the light grew slightly less deep in shade.

She looked at it momentarily. "I suppose that's it. A kind of strength without weight."

"Jehoshaphat," said Baley.

"Are you offended?" Her fingers lifted and the yellow slant of light remained solitary and stationary.

"No, not at all. But what is it? How do you do it?"

"That's hard to explain," said Gladia, looking at the pedestal thoughtfully, "considering I don't really understand it myself. It's a kind of optical illusion, I've been told. We set up force-fields at different energy-levels. They're extrusions of hyper-space really and don't have the properties of ordinary space at all. Depending on the energy-level, the human eye sees light of different shades. The shapes and colors are controlled by the warmth of my fingers against appropriate

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spots on the pedestal. There are all sorts of controls inside each pedestal."

"You mean if I were to put my finger there—" Baley advanced and Gladia made way for him. He put a hesitant forefinger down upon the pedestal and felt a soft throbbing.

"Go ahead. Move your finger, Elijah," said Gladia.

Baley did so and a dirty-gray jag of light lifted upward, skewing the yellow light. Baley withdrew his finger sharply and Gladia laughed and then was instantly contrite.

"I shouldn't laugh," she said. "It's really very hard to do, even for people who've tried a long time." Her own hand moved lightly and too quickly for Baley to follow and the monstrosity he had set up disappeared, leaving the yellow light in isolation again.

"How did you learn to do this?" asked Baley.

"I just kept on trying. It's a new art-form, you know and only one or two really know how—"

"And you're the best," said Baley, somberly. "On Solaria everyone is either the only or the best or both."

"You needn't laugh. I've had some of my pedestals on display. I've given shows." Her chin lifted. There was no mistaking her pride.

She went on, "Let me go on with your portrait." Her fingers moved again.

There were few curves in the light-form that grew under her ministrations. It was all sharp

angles. And the dominant color was blue.

"That's Earth, somehow," said Gladia, biting her lower lip. "I always think of Earth as blue. All those people and seeing, seeing, seeing. Viewing is more rose. How does it seem to you?"

"Jehoshaphat, I can't picture things as colors."

"Can't you?" she asked, abstractedly. "Now you say 'Jehoshaphat' sometimes and that just a little blob of violet. A little sharp blob because it usually comes out ping, like that." And the little blob was there, glowing just off-center.

"And then," she said, "I can finish it like this." And a flat, lusterless hollow cube of slate-gray sprang up to enclose everything. The light within shone through it, but dimmer; imprisoned, somehow.

Baley felt a sadness at it, as though it were something enclosing him, keeping him from something he wanted. He said, "What's that last?"

Gladia said, "Why, the walls about you. That's what's most in you, the way you can't go outside, the way you have to be inside. You are inside there. Don't you see?"

Baley saw and somehow he disapproved. He said, "Those walls aren't permanent. I've been out today."

"You have? Did you mind?"

He could not resist a counter-dig. "The way you mind seeing me. You don't like it but you can stand it."

She looked at him thoughtfully.

"Do you want to come out now? With me? For a walk?"

It was Baley's impulse to say: Jehoshaphat, no.

She said, "I've never walked with anyone, seeing. It's still daytime, and it's pleasant weather."

Baley looked at his abstractionist portrait and said, "If I go, will you take away the gray?"

She smiled and said, "I'll see how you behave."

The structure of light remained as they left the room. It stayed behind, holding Baley's imprisoned soul fast in the gray of the Cities.

Baley shivered slightly. Air moved against him and there was a chill to it.

Gladia said, "Are you cold?"

"It wasn't like this before," muttered Baley.

"It's late in the day now, but it isn't really cold. Would you like a coat? One of the robots could bring one in a minute."

"No. It's all right." They stepped forward along a narrow paved path. He said, "Is this where you used to walk with Dr. Leebig?"

"Oh, no. We walked way out among the fields, where you only see an occasional robot working and you can hear the animal sounds. You and I will stay near the house though, just in case."

"In case what?"

"Well, in case you want to go in."

"Or in case you get weary of seeing?"

"It doesn't bother me," she said, recklessly.

There was the vague rustle of leaves above and an all-pervading yellowness and greenness. There were sharp, thin cries in the air about, plus a strident humming, and shadows, too.

He was especially aware of the shadows. One of them stuck out before him, in shape like a man, that moved as he did in horrible mimicry. Baley had heard of shadows, of course, and he knew what they were, but in the pervasive indirect lighting of the Cities he had never been specifically aware of one.

Behind him, he knew, was the sun. He took care not to look at it, but he knew it was there.

Space was large, space was lonely.

Yet he found it drawing him to it. He found his mind picturing himself striding the surface of a world with miles and thousands of miles and light-years of room all about him. A lonely figure!

Why should he find attraction in this thought of loneliness. To be alone, without others; or ahead, with others far behind—

His thoughts grew confusing and he shook his head as though to get rid of them. He didn't want loneliness. He *didn't*. He wanted Earth and the warmth and companionship of the man-crammed Cities.

Yet the picture failed him. He tried to conjure up New York in his mind, all the noise and fullness of it, and found he could remain

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conscious only of the quiet, air-moving chill of the surface of Solaria.

Without quite willing it, he moved closer to Gladia until he was two feet away, then grew aware of her startled face.

"I beg your pardon," he said at once, and drew off.

She gasped, "It's all right. Won't you walk this way? We have some flower-beds you might like."

The direction she indicated lay away from the sun. Baley followed silently.

Gladia said, "Later in the year, it will be wonderful. In the warm weather I can run down to the lake and swim, or just run across the fields, run as fast as I can until I'm just glad to fall down and lie still."

She looked down at herself. "But this is no costume for it. With all this on, I've *got* to walk. Sedately, you know."

"How would you prefer to dress?" asked Baley.

"Halter and shorts at the *most*," she cried, lifting her arms as though feeling the freedom of that in her imagination. "Sometimes less. Sometimes just sandals so you can feel the air with every inch. Oh, I'm sorry. I've offended you."

Baley said, "No. It's all right. Was that your costume when you went walking with Dr. Leebig?"

"It varied. It depended on the weather. Sometimes I wore very little, but it was viewing, you know. You *do* understand, I hope."

"I understand. What about Dr.

Leebig, though? Did he dress lightly, too?"

"Jothan dress lightly?" Gladia smiled flashingly. "Oh, no. He's very solemn, always." She twisted her face into a thin look of gravity and half-winked, catching the very essence of Leebig and forcing a short grunt of appreciation out of Baley.

"This is the way he talks," she said. "'My dear Gladia, in considering the effect of a first-order potential on positron flow—'"

"Is that what he talked to you about? Robotics?"

"Mostly. Oh, he takes it so seriously, you know. He was always trying to teach me about it. He never gave up."

"Did you learn anything?"

"Not one thing. Nothing. It's just all a complete mix-up to me. He'd get angry with me sometimes but when he'd scold, I'd dive into the water, if we were anywhere near the lake, and splash him."

"*Splash* him? I thought you were viewing."

She laughed. "You're *such* an Earthman. I'd splash where he was standing in his own room or on his own estate. The water couldn't touch him, but he would duck just the same. Look at that."

Baley looked. They had circled a wooded patch and now came upon a clearing, centered about an ornamental pond. Small bricked walks penetrated the clearing and broke it up. Flowers grew in profusion and

order. Baley knew them for flowers from book-films he had viewed.

In a way, the flowers were like the light-patterns that Gladia constructed and Baley imagined that she constructed them in the spirit of flowers. He touched one cautiously, then looked about. Reds and yellows predominated.

In turning to look about, Baley caught a glimpse of the sun.

He said, uneasily, "The sun is low in the sky."

"It's late afternoon," called Gladia back to him. She had run toward the pond and was sitting on a stone bench at its edge. "Come here," she shouted, waving. "You can stand if you don't like to sit on stone."

Baley advanced slowly. "Does it get this low every day?" and at once he was sorry he asked. If the planet rotated, the sun must be low in the sky both mornings and afternoons. Only at midday could it be high.

Telling himself this couldn't change a lifetime of pictured thought. He knew there was such a thing as night and had even experienced it, with a planet's whole thickness interposing safely between a man and the sun. He knew there were clouds and a protective grayness hiding the worst of outdoors. And still, when he thought of planetary surfaces, it was always a picture of a blaze of light with a sun high in the sky.

He looked over his shoulder, just quickly enough to get a flash of

sun, and wondered how far the house was if he should decide to return.

Gladia was pointing to the other end of the stone bench.

Baley said, "That's pretty close to you, isn't it?"

She spread out her little hands, palms up. "I'm getting used to it. Really."

He sat down, facing toward her to avoid the sun.

She leaned over backward toward the water and pulled a small cup-shaped flower, yellow without and white-streaked within, not at all flamboyant. She said, "This is a native plant. Most of the flowers here are from Earth originally."

Water dripped from its severed stem as she extended it gingerly toward Baley.

Baley reached for it as gingerly. "You killed it," he said.

"It's only a flower. There are thousands more." Suddenly, before his fingers more than touched the yellow cup, she snatched it away, her eyes kindling. "Or are you trying to imply I could kill a human being because I pulled a flower?"

Baley said, in soft conciliation, "I wasn't implying anything. May I see it?"

Baley didn't really want to touch it. It had grown in wet soil and there was still the effluvia of mud about it. How could these people, who were so careful in contact with Earthmen and even with one another, be so careless in their contact with ordinary dirt?

But he held the stalk between thumb and forefinger and looked at it. The cup was formed of several thin pieces of papery tissue, curving up from a common center. Within it was a white convex swelling, damp with liquid and fringed with dark hairs that trembled lightly in the wind.

She said, "Can you smell it?"

At once, Baley was aware of the odor that emanated from it. He leaned toward it and said, "It smells like a woman's perfume."

Gladia clapped her hands in delight. "How like an Earthman. What you really mean is that a woman's perfume smells like *that*."

Baley nodded ruefully. He was growing weary of the outdoors. The shadows were growing longer and the land was becoming somber. Yet he was determined not to give in. He wanted those gray walls of light that dimmed his portrait removed. It was quixotic, but there it was.

Gladia took the flower from Baley who let it go without reluctance. Slowly, she pulled its petals apart. She said, "I suppose every woman smells differently."

"It depends on the perfume," said Baley, indifferently.

"Imagine being close enough to tell. I don't wear perfume because no one is. Except now. But I suppose you smell perfume often, all the time. On Earth, your wife is always with you, isn't she?" She was concentrating very hard on the

flower, frowning as she plucked it carefully to pieces.

"She's not always with me," said Baley. "Not every minute."

"But most of the time. And whenever you want to—"

Baley said, suddenly, "Why did Dr. Leebig try so hard to teach you robotics, do you suppose?"

The dismembered flower consisted now of a stalk and the inner swelling. Gladia twirled it between her fingers, then tossed it away, so that it floated for a moment on the surface of the pond. "I think he wanted me to be his assistant," she said.

"Did he tell you so, Gladia?"

"Toward the end, Elijah. I think he grew impatient. Anyway, he asked me if I didn't think it would be exciting to work in robotics. Naturally, I told him I could think of nothing duller. He was quite angry."

"And he never walked with you again after that."

She said, "You know, I think that may have been it. I suppose his feelings were hurt. Really, though, what could I do?"

"It was before that, though, that you told him about your quarrels with Dr. Delmarre."

Her hands became fists and held so in a tight spasm. Her body held stiffly to its position, head bent and a little to one side. Her voice was unnaturally high. "What quarrels?"

"Your quarrels with your husband. I understand you hated him."

Her face was distorted and

blotched as she glared at him. "Who told you that? Jothan?"

"Dr. Leebig mentioned it. I think it's true."

She was shaken. "You're still trying to prove I killed him. I keep thinking you're my friend and you're only . . . only a detective."

She raised her fists and Baley waited.

He said, "You know you can't touch me."

Her hands dropped and she began crying without a sound. She turned her head away.

Baley bent his own head and closed his eyes, shutting out the disturbing long shadows. He said, "Dr. Delmarre was not a very affectionate man, was he?"

She said, in a strangled way, "He was a very busy man."

Baley said, "You *are* affectionate, on the other hand. You find a man interesting. Do you understand?"

"I c-can't help it. I know it's disgusting, but I can't help it. It's even disgusting t-to talk about it."

"You did talk about it to Dr. Leebig, though?"

"I *had* to do something and Jothan was handy and he didn't seem to mind and it made me feel better."

"Was this the reason you quarreled with your husband? Was it that he was cold and unaffectionate and you resented it?"

"Sometimes I hated him." She shrugged her shoulders helplessly. "He was just a good Solarian and

we weren't scheduled for ch . . . for ch—" She broke down.

Baley waited. His own stomach was cold and open air pressed down heavily upon him. When Gladia's sobs grew quieter, he asked, as gently as he could, "Did you kill him, Gladia."

"N-no." Then, suddenly, as though all resistance had corroded within her, "I haven't told you everything."

"Well, then, please do so now."

"We were quarreling that time, the time he died. The old quarrel. I screamed at him but he never shouted back. He hardly ever even said anything and that just made it worse. I was so angry, so angry. I don't remember after that."

"Jehoshaphat!" Baley swayed slightly and his eyes sought the neutral stone of the bench. "What do you mean you don't remember?"

"I mean he was dead and I was screaming and the robots came—"

"Did you kill him?"

"I don't remember it, Elijah, and I would remember it if I did, wouldn't I? Only I don't remember anything else, either, and I've been so frightened, so frightened. Help me, please, Elijah."

"Don't worry, Gladia. I'll help you." Baley's reeling mind fastened on the murder weapon. What happened to it? It must have been removed. If so, only the murderer could have done it. Since Gladia was found immediately after the murder on the scene, she could not have done it. The murderer would

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have to be someone else. No matter how it looked to everyone on Solaria, it had to be someone else.

Baley thought, sickly: I've got to get back to the house.

He said, "Gladia—"

Somehow he was staring at the sun. It was nearly at the horizon. He had to turn his head to look at it and his eyes locked with a morbid fascination. He had never seen it so. Fat, red, and dim somehow, so that one could look at it without blinking, and see the bleeding clouds above it in thin lines, with one crossing it in a bar of black.

Baley mumbled, "The sun is so red."

He heard Gladia's choked voice say, drearily, "It's always red at sunset, red and dying."

Baley had a vision. The sun was moving down to the horizon because the planet's surface was moving away from it, a thousand miles an hour, spinning under that naked sun, spinning with nothing to guard the microbes called men that scurried over its spinning surface, spinning madly forever, spinning . . . spinning—

It was his head that was spinning and the stone bench that was slanting beneath him and the sky heaving, blue, dark blue, and the sun was gone, with the tops of trees and the ground rushing up and Gladia screaming thinly and another sound—

XVI

Baley was aware first of enclosure,
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the absence of the open, and then of a face bending over him.

He stared for a moment, without recognition. Then: "Daneel!"

The robot's face showed no sign of relief or of any other recognizable emotion at being addressed. He said, "It is well that you have recovered consciousness, partner Elijah. I do not believe you have suffered physical injury."

"I'm all right," said Baley, testily, struggling to his elbows. "Jehoshaphat, am I in bed? What for?"

"You have been exposed to the open a number of times today. The effects upon you have been cumulative and you need rest."

"I need a few answers first." Baley looked about and tried to deny to himself that his head was spinning just a little. He did not recognize the room. The curtains were drawn. Lights were comfortably artificial. He was feeling much better. "For instance, where am I?"

"In a room of Mrs. Delmarre's mansion."

"Next, let's get something straight. What are *you* doing here? How did you get away from the robots I set over you?"

Daneel said, "It had seemed to me that you would be displeased at this development and yet in the interests of your safety and of my orders, I felt that I had no choice but—"

"What did you *do*? Jehoshaphat!"

"It seems Mrs. Delmarre at-

tempted to view you some hours ago."

"Yes," Baley remembered Gladia saying as much earlier in the day. "I know that."

"Your order to the robots that held me prisoner was, in your words: 'Do not allow him'—meaning myself—to establish contact with other humans or other robots, either by seeing or by viewing.' However, Partner Elijah, you said nothing about forbidding other humans or robots to contact me. You see the distinction?"

Baley groaned.

Daneel said, "No need for distress, Partner Elijah. The flaw in your orders was instrumental in saving your life, since it brought me to the scene. You see, when Mrs. Delmarre viewed me, being allowed to do so by my robot guardians, she asked after you and I answered, quite truthfully, that I did not know of your whereabouts, but that I could attempt to find out. She seemed anxious that I do so. I said I thought it possible you might have left the house temporarily and that I would check that matter and would she, in the meanwhile, order the robots in the room with me, to search the mansion for your presence."

"Wasn't she surprised that you didn't deliver the orders to the robots yourself?"

"I gave her the impression, I believe, that as an Auroran I was not as accustomed to robots as she was; that she might deliver the orders

with greater authority and effect a more speedy consummation. Solarians, it is quite clear, are vain of their skill with robots and contemptuous of the ability of natives of other planets to handle them. Is that not your opinion as well, Partner Elijah?"

"And she ordered them away, then?"

"With difficulty. They protested previous orders but, of course, could not state the nature thereof since you had ordered them to tell no one of my own true identity. She overrode them, although the final orders had to be shrilled out in fury."

"And then you left."

"I did, Partner Elijah."

A pity, thought Baley, Gladia did not consider that episode important enough to relay to him when he viewed her. He said, "It took you long enough to find me, Daneel."

"The robots on Solaria have a network of information through sub-etheric contact. A skilled Solarian could obtain information readily, but, mediated as it is through millions of individual machines, one such as myself, without experience in the matter, must take time to unearth a single datum. It was better than an hour before the information as to your whereabouts reached me. I lost further time by visiting Dr. Delmarre's place of business after you had departed."

"What were you doing there?"

"Pursuing researches of my own. I regret that this had to be done in

your absence, but the exigencies of the investigation left me no choice."

Baley said, "Did you view Kloitta Cantoro, or see her?"

"I viewed her, but from another part of her building, not from our own estate. There were records at the farm which I had to see. Ordinarily viewing would have been sufficient, but it might have been inconvenient to remain on our own estate since three robots knew my real nature and might easily have imprisoned me once more."

Baley felt almost well. He swung his legs out of bed and found himself in a kind of nightgown. He stared at it with distaste. "Get me my clothes."

Daneel did so.

As Baley dressed, he said, "Where's Mrs. Delmarre?"

"Under house arrest, Partner Elijah."

"What? By whose order?"

"By my order. She is confined to her bedroom under robotic guard and her right to give orders other than to meet personal needs has been neutralized."

"By yourself?"

"The robots on this estate are not aware of my identity."

Baley finished dressing. "I know the case against Gladia," he said. "She had the opportunity; more of it, in fact, than we thought at first. She did not rush to the scene at the sound of her husband's cry, as she first said. She was there all along."

"Does she claim to have witnessed the murder and seen the murderer?"

"No. She remembers nothing of the crucial moments. That happens sometimes. It turns out, also, that she has a motive."

"What was it, Partner Elijah?"

"One that I had suspected as a possibility from the first. I said to myself, if this were Earth, and Dr. Delmarre were as he was described to be and Gladia Delmarre as she seemed to be, I would say that she was in love with him, or had been, and that he was in love only with himself. The difficulty was to tell whether Solarians felt love or reacted to love in any Earthly sense. My judgment as to their emotions and reactions wasn't to be trusted. It was why I had to see a few. *Not* view them, but see them."

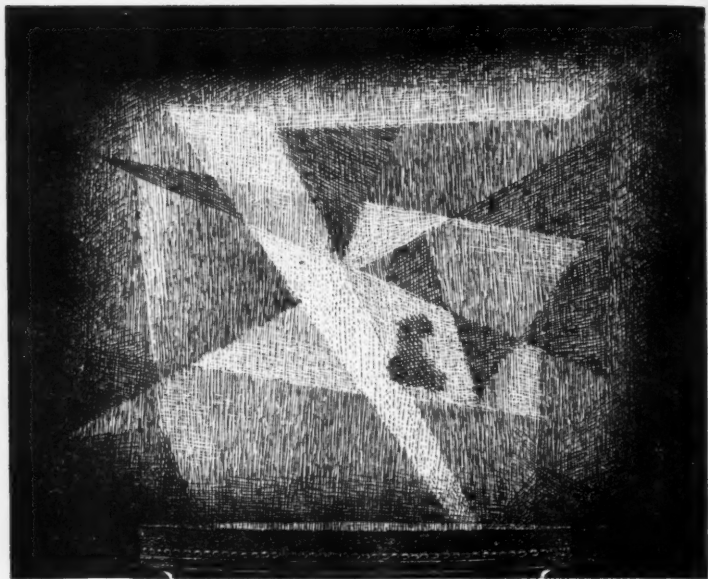
"I do not follow you, Partner Elijah."

"I don't know if I can explain it to you. These people have their gene possibilities carefully plotted before birth and the actual gene distribution tested after birth."

"I know that."

"But genes aren't everything. Environment counts, too, and environment can bend into actual psychosis where genes indicate only a potentiality for a particular psychosis. Did you notice Gladia's interest in Earth?"

"I remarked upon it, Partner Elijah, and considered it an assumed interest designed to influence your opinions."



"Suppose it were a real interest, even a fascination. Suppose there were something about Earth's crowds which excited her. Suppose she were attracted against her will by something she had been taught to consider filthy. There was possible abnormality. I had to test it by seeing Solarians and noticing how they reacted to it, and seeing her and noticing how *she* reacted to it. It was why I had to get away from you, Daneel, at any cost. It was why I had to abandon viewing as a method for carrying on the investigation."

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"You did not explain this, Partner Elijah."

"Would the explanation have helped against what you conceived your duty under First Law to be?"

Daneel was silent.

Baley said, "The experiment worked. I saw, or tried to see, several people. An old sociologist tried to see me and had to give up midway. A roboticist refused to see me at all even under terrific force. The bare possibility sent him into an almost infantile frenzy. He sucked his finger and wept. Dr. Delmarre's assistant was used to personal presence in the way of her profession

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and so she tolerated me, but at twenty feet only. Gladia, on the other hand—"

"Yes, Partner Elijah?"

"Gladia consented to see me without more than a slight hesitation. She tolerated my presence easily and actually showed signs of decreasing strain as time went on. It all fits into a pattern of psychosis. She didn't mind seeing me; she was interested in Earth; she might have felt an abnormal interest in her husband. All of it could be explained by a strong and for this world, psychotic, interest in the personal presence of members of the opposite sex. Dr. Delmarre, himself, was not the type to encourage such a feeling or co-operate with it. It must have been very frustrating to her."

Daneel nodded. "Frustrating enough for murder in a moment of passion."

"In spite of everything, I don't think so, Daneel."

"Are you perhaps being influenced by extraneous motives of your own, Partner Elijah. Mrs. Delmarre is an attractive woman and you are an Earthman in whom a preference for the personal presence of an attractive woman is not psychotic."

"I have better reasons," said Baley, uneasily. (Daneel's cool glance was too penetrating and soul-dissecting by half. Jehoshaphat! The thing was only a machine.) He said, "If she were the murderess of her husband, she would also have to be the attempted murderess of Gruer."

He had almost the impulse to explain the way murder could be manipulated through robots, but held back. He was not sure how Daneel would react to a theory that made unwitting murderers of robots.

Daneel said, "And the attempted murderess of yourself as well."

Baley frowned. He had had no intention of telling Daneel of the poisoned arrow that had missed; no intention of strengthening the other's already too-strong protective complex vis-a-vis himself.

He said, angrily, "What did Kloitta tell you?" He ought to have warned her to keep quiet, but then, how was he to know that Daneel would be about, asking questions.

Daneel said, calmly, "Mrs. Cantoro had nothing to do with the matter. I witnessed the murder attempt myself."

Baley was thoroughly confused. "You were nowhere about."

Daneel said, "I caught you myself and brought you here an hour ago."

"What are you talking about?"

"Do you not remember, Partner Elijah. It was almost a perfect murder. Did not Mrs. Delmarre suggest that you go into the open. I was not a witness to that, but I feel certain she did."

"She did suggest it. Yes."

"She may even have enticed you to leave the house."

Baley thought of the "portrait" of himself, of the enclosing gray

walls. Could it have been clever psychology? Could a Solarian have that much intuitive understanding of the psychology of an Earthman?

"No," he said.

Daneel said, "Was it she that suggested you go down to the ornamental pond and sit on the bench?"

"Well, yes."

"Does it occur to you that she might have been watching you, noticing your gathering dizziness?"

"She asked if I wanted to go back once or twice."

"She might not have meant it seriously. She might have been watching you turn sicker on that bench. She might even have pushed you, or perhaps a push wasn't necessary. At the moment I reached you and caught you in my arms, you were in the process of falling backward off the stone bench and into three feet of water, in which you would surely have drowned."

For the first time, Baley recalled those last fugitive sensations. "Jehoshaphat!"

"Moreover," said Daneel, with calm relentlessness, "Mrs. Delmarre sat beside you, watching you fall, without a move to stop you. Nor would she have attempted to pull you out of the water. She would have let you drown. She might have called a robot, but the robot would surely have arrived too late. And afterward, she would explain merely that, of course, it was impossible for her to touch you even to save your life."

True enough, thought Baley, sick-

ly. No one would question her inability to touch a human being. The surprise, if any, would come at her ability to be as close to one as she was.

Daneel said, "You see, then, Partner Elijah, that her guilt can scarcely be in question. You stated that she would have to be the attempted murderess of Agent Gruer as though this were an argument against her guilt. You see now that she must have been. Her only motive to murder you was the same as her motive for trying to murder Gruer; the necessity of getting rid of an embarrassingly persistent investigator of the first murder."

Baley said, "The whole sequence might have been an innocent one. She might never have realized how the outdoors would affect me."

"She studied Earth. She knew the peculiarities of Earthmen."

"I assured her I had been outdoors today and that I was growing used to it."

"She may have known better."

Baley pounded fist against palm. "You're making her too clever. It doesn't fit and I don't believe it. In any case, no murder accusation can stick unless and until the absence of the murder weapon can be accounted for."

Daneel looked steadily at the Earthman, "I can do that, too, Partner Elijah."

Baley looked at his robot partner with a stunned expression. "How?"

"Your reasoning, you will remem-

ber, Partner Elijah, was this: Were Mrs. Delmarre the murderess, then the weapon, whatever it was, must have remained at the scene of the murder. The robots, appearing almost at once, saw no sign of such a weapon, hence it must have been removed from the scene, hence the murderer must have removed it, hence the murderer could not be Mrs. Delmarre. Is all that correct?"

"Correct."

"Yet," continued the robot, "there is one place where the robots did not look for the weapon."

"Where?"

"Under Mrs. Delmarre. She was lying in a faint, brought on by the excitement and passion of the moment, whether murderess or not, and the weapon, whatever it was, lay under her and out of sight."

Baley said, "Then the weapon would have been discovered as soon as she were moved."

"Exactly," said Daneel, "but she was not moved by the robots. She herself told us yesterday at dinner that Dr. Thool ordered the robots to put a pillow under her head and leave her. She was first moved by Dr. Altim Thool, himself, when he arrived to examine her."

"So?"

"It follows therefore, Partner Elijah, that a new possibility arises. Mrs. Delmarre was the murderess, the weapon was at the scene of the crime, but Dr. Thool carried it off and disposed of it to protect Mrs. Delmarre."

Baley felt contemptuous. He had

almost been seduced into expecting something reasonable. He said, "Completely motiveless. Why should Dr. Thool do such a thing?"

"For a very good reason. You remember Mrs. Delmarre's remarks concerning him: 'He always treated me since I was a child and was always so friendly and kind.' I wondered if he might have some motive for being particularly concerned about her. It was for that reason that I visited the baby farm and inspected the records. What I had merely guessed at as a possibility turned out to be the truth."

"What?"

"Dr. Altim Thool was the father of Gladia Delmarre, and what is more, he knew of the relationship."

Baley had no thought of disbelieving the robot. He felt only a deep chagrin that it had been Robot Daneel Olivaw and not himself that had carried through the necessary piece of logical analysis. Even so, it was not complete.

He said, "Have you spoken to Dr. Thool?"

"Yes. I have placed him under house arrest, also."

"What does he say?"

"He admits that he is the father of Mrs. Delmarre. I confronted him with the records of the fact and the records of his inquiries into her health when she was a youngster. As a doctor, he was allowed more leeway in this respect than another Solarian might have been allowed."

"Why should he have inquired into her health?"

"I have considered that, too, Partner Elijah. He was an old man when he was given special permission to have an additional child and, what is more, he succeeded in producing one. He considers this a tribute to his genes and to his physical fitness. He is prouder of the result, perhaps, than is quite customary on this world. Moreover, his position as physician, a profession little regarded on Solaria because it involves personal presences, made it the more important to him to nurture this sense of pride. For that reason, he maintained unobtrusive contact with his offspring."

"Does Gladia know anything of it."

"As far as Dr. Thool is aware, Partner Elijah, she does not."

Baley said, "Does Thool admit removing the weapon?"

"No. That he does not."

"Then you've got nothing, Daneel."

"Nothing?"

"Unless you can find the weapon and prove he took it, or at the very least induce him to confess, you have no evidence. A chain of deduction is pretty but it isn't evidence."

"The man would scarcely confess without considerable questioning of a type I myself could not carry through. His daughter is dear to him."

"Not at all," said Baley, savagely.

"His feeling for his daughter is not

at all what you or I are accustomed to. Solaria is different!"

He strode the length of the room and back, letting himself cool. He said, "Daneel, you have worked out a perfect exercise in logic, but none of it is reasonable just the same." (Logical but not reasonable, wasn't that the definition of a robot?)

He went on, "Dr. Thool is an old man and past his best years, regardless of whether he was capable of siring a daughter thirty years or so ago. Even Spacers get senile. Picture him then examining his daughter in a faint and his son-in-law dead by violence. Can you imagine the unusual nature of the situation for him? Can you suppose he could have remained master of himself? So much the master of himself, in fact, as to carry out a series of amazing actions?"

"Look! First, he would have had to notice a weapon under his daughter which must have been so well covered by her body that the robots never noticed it. Secondly, from whatever small scrap of object he noted, he must have deduced the presence of the weapon and seen at once that if he could but sneak off with that weapon, unseen, a murder accusation against his daughter would be hard to substantiate. That's pretty subtle thinking for an old man in a panic. Then, thirdly, he would have had to carry the plan through, also tough for an old man in a panic. And now, lastly, he would have to dare to compound the felony further by sticking to

his lie. It all may be the result of logical thinking, but none of it is reasonable."

Daneel said, "Do you have an alternate solution to the crime, Partner Elijah?"

Baley had sat down during the course of his last speech and now he tried to rise again, but a combination of weariness and the depth of the chair defeated him. He held out his hand petulantly. "Give me a hand, will you, Daneel?"

Daneel stared at his own hand. "I beg your pardon, Partner Elijah?"

Baley silently cursed the other's literal mind and said, "Help me out of the chair."

Daneel's strong arm lifted him out of the chair effortlessly.

Baley said, "Thanks. No, I haven't an alternate solution. At least, I have, but the whole thing hinges on the location of the weapon."

He walked impatiently to the heavy curtains that lined most of one wall and lifted a corner without quite realizing what he was doing. He stared at the black patch of glass until he became aware of the fact that he was looking out into the early night just as Daneel, who had approached quietly, took it out of his fingers.

In the split-fraction of a moment in which Baley watched the robot's hand take the curtain away from him with the loving caution of a mother protecting her idiot child

from the fire, a revolution took place within him.

He cried out incoherently and snatched the curtain back, yanking it out of Daneel's grasp. Throwing his full weight against it, he tore it away from the window, leaving shreds behind.

"Partner Elijah!" said Daneel, softly. "Surely you know now what the open will do to you."

"I know," said Baley, chokingly, "what it will do *for* me."

He stared out the window. There was nothing to see, only blackness but that blackness was open air, unilluminated by sun. It was unbroken, unobstructed space, none the less so for being unlit, and he was facing it.

But for the first time, he knew what he had to do. Really knew! He was facing the open *not* to prove himself unpeccable, *not* because he told himself it was the road to the solution of a murder. He faced it out of free choice, knowingly, because he knew he had to face the open for its own sake, and that made all the difference.

Walls were crutches! Darkness and crowds were crutches! And he must have thought of them as such and hated them even when he most thought he loved and needed them. Why else had he resented Gladia's gray enclosure of his portrait so?

He felt himself filling with a sense of excitement that was almost victory, and as though victory were contagious a new thought came, bursting like an inner shout.

Baley turned dizzily to Daneel, his brain on fire.

"I know!" he said in a tight whisper that came from the back of his throat and tore at him in its effort to get out. "Jehoshaphat! I know!"

"Know what, Partner Elijah?"

"I know what happened to the weapon. I know who is responsible. All at once, because of one obvious thought— *Obvious*, Daneel! And everything falls into place."

XVII

Daneel would allow no immediate action.

"Tomorrow!" he had said, with firm respect. "That is my suggestion, Partner Elijah. It is late and you are in need of rest."

Baley had to admit the truth of it and besides, there was the need of preparation; a considerable quantity of it. He had the solution of the murder, he felt sure of that, but it rested on deduction, as much as had Daneel's theory, and it was worth as little as evidence. Solarians would have to help him.

And if he were to face them, one Earthman against half a dozen Spacers, he would have to be in full control. That meant rest and preparation.

Yet he would not sleep. He was certain he would not sleep. Not all the softness of the special bed set up for him by smoothly-functioning robots, nor all the soft perfume and softer music in the special room of

Gladia's mansion would help. He was sure of it.

Daneel sat unobtrusively in one darkened corner.

Baley said, "Are you still afraid of Gladia?"

The robot said, "I do not think it wise to allow you to sleep alone and unprotected."

"Well, have your way. Are you clear as to what I want you to do; Daneel?"

"I do, Partner Elijah."

"You have no reservations under the First Law, I hope."

"I have some with respect to the conference you wish arranged. Will you be armed and careful of your own safety?"

"I assure you, I will."

Daneel delivered himself of a sigh that was somehow so human that for a moment, Baley found himself trying to penetrate the darkness that he might study the machine-perfect face of the other.

Daneel said, "I have not always found human behavior logical."

"We need Three Laws of our own," said Baley, "but I'm glad we don't have them."

He stared at the ceiling. A great deal depended on Daneel and yet he could tell him very little of the whole truth. Robots were too involved. The planet, Aurora, had its reasons for sending a robot as representative of their interests, but it was a mistake. Robots had their limitations.

Still, if all went right, this could all be over in twelve hours. He

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could be heading back to Earth in twenty-four. Earth! New York! Jessie and Ben!

But the thought failed to conjure the comfort he had a right to expect. They ran hollowly in the cavern of his skull. There was an estrangement between himself and the Cities. He *couldn't* sleep!

And at some unknown point in time, it all faded and he slept.

Baley, having slept and then wakened, showered and dressed. Physically, he was quite prepared. Yet, he was unsure. It was not that his reasoning seemed any less cogent to himself in the pallor of morning. It was rather the necessity of facing Solarians.

Could he be sure of their reactions after all? Or would he be pushing buttons blind? Still!

Gladia was the first to appear. It was simple for her, of course. She was on an intra-mural circuit, since she was in the mansion itself. She was pale and expressionless, in a white gown that draped her into a cold statue.

She stared helplessly at Baley. Baley smiled back gently and she seemed to take comfort from that.

One by one, they appeared now. Attlebish, the acting Security Head appeared next after Gladia, lean and haughty, his large chin set in disapproval. Then Leebig, the robotist, impatient and angry, his weak eyelid fluttering periodically. Quemot, the sociologist, a little tired, but smiling at Baley out of deep-set

eyes in a condescending way, as though to say: We have seen one another, we have been intimate.

Kloitta Cantoro, when she appeared, seemed uneasy in the presence of the others. She glanced at Gladia for a moment with an audible sniff, then stared at the floor. Dr. Thool, the physician, appeared last. He looked haggard, almost sick.

They were all there, all but Gruer, who was slowly recovering and for whom attendance was physically impossible. (Well, thought Baley, we'll do without him.) All were dressed formally; all sat in rooms which were well-curtained into enclosure.

Daneel had arranged matters well. Baley hoped fervently that what remained for Daneel to do would work as well.

Baley looked from one Spacer to the other. His heart thudded. Each figure viewed him out of a different room and the clash of lighting, furniture and wall decoration was dizzying.

Baley said, "I want to discuss the matter of the killing of Dr. Rickain Delmarre under the heading of motive, opportunity and means, in that order—"

Attlebish interrupted. "Will this be a long speech?"

Baley said, sharply, "It may be. I have been called here to investigate a murder and such a job is my specialty and my profession. I know best how to go about it." (Take nothing from them now, he

thought, or this whole thing won't work. Dominate! Dominate!)

He went on, making his words as sharp and incisive as he could. "Motive first. In a way, motive is the most unsatisfactory of the three items. Opportunity and means are objective. They can be investigated factually. Motive is subjective. It may be something which can be observed by others; revenge for a known humiliation, for instance. But it also may be completely unobservable; an irrational, homicidal hate on the part of a well-disciplined person who never lets it show.

"Now almost all of you have told me at one time or another that you believed Gladia Delmarre to have committed the crime. Certainly, no one has suggested an alternate suspect. Has Gladia a motive? Dr. Leebig suggested one. He said that Gladia quarreled frequently with her husband and Gladia later admitted this to me. The rage that can arise out of a quarrel can, conceivably, move a person to murder. Very well.

"The question remains, though, whether she is the only one with a motive. I wonder. Dr. Leebig, himself—"

The roboticist almost jumped. His hand extended rigidly in the direction of Bale. "Watch what you say, Earthman."

"I am only theorizing," said Bale, coldly. "You, Dr. Leebig, were working with Dr. Delmarre on new robot models. You are the

best man in Solaria as far as robotics is concerned. You say so and I believe it."

Leebig smiled with open condescension.

Bale went on. "But I have heard that Dr. Delmarre was about to break off relations with you for matters concerning yourself of which he disapproved."

"False! False!"

"Perhaps. But what if it were true? Wouldn't you have a motive to get rid of him before he humiliated you publicly by breaking with you? I have a feeling you could not easily bear such humiliation."

Bale went on rapidly to give Leebig no chance to retort. "And you, Mrs. Cantoro. Dr. Delmarre's death leaves you in charge of fetal engineering, a responsible position."

"Skies above, we talked about that before," cried Kloitta, in anguish.

"I know we did, but it's a point that must be considered, anyway. As for Dr. Quemot, he played chess with Dr. Delmarre regularly. Perhaps he grew annoyed at losing too many games."

The sociologist interposed quietly. "Losing a chess game is insufficient motive surely, plainclothesman."

"It depends on how seriously you take your chess. Motives can seem all the world to the murderer and completely insignificant to everyone else. Well, it doesn't matter. My

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point is that motive alone is insufficient. Anyone can have a motive, particularly for the murder of a man such as Dr. Delmarre."

"What do you mean by that remark," demanded Quemot in indignation.

"Why, only that Dr. Delmarre was a 'good Solarian.' You all described him as such. He rigidly fulfilled all the requirements of Solarian custom. He was an ideal man, almost an abstraction. Who could feel love, or even liking, for such a man? A man without weaknesses serves only to make everyone else conscious of his own imperfections. A primitive poet, named Tennyson, once wrote: 'He is all fault who has no fault at all!'"

"No one would kill a man for being too good," said Kloitta, frowning.

"You little know," said Baley, and went on without amplification. "Dr. Delmarre was aware of a conspiracy on Solaria, or thought he was; a conspiracy which was preparing an assault on the rest of the galaxy for purposes of conquest. He was interested in preventing that. For that reason, those concerned in the conspiracy might find it necessary to do away with him. Anyone here could be a member of the conspiracy, including, to be sure, Mrs. Delmarre, but including even the Acting Head of Security, Corwin Attlebish."

"I?" said Attlebish, unmoved.

"You certainly attempted to end

the investigation as soon as Gruer's mishap put you in charge."

Baley took a few slow sips at his drink—straight from its original container, untouched by human hands other than his own, or robotic hands, either—and gathered his strength. So far, this was a waiting game, and he was thankful the Solarians were sitting still for it. They hadn't the Earthman's experience of dealing with people at close quarters. They weren't infighters. He even pitied them. Poor Spacers! So clumsy when they had to handle people like themselves, rather than robots.

Baley felt some of his hatred leak away. It was easy to hate supermen, not so easy to hate poor Spacers!

He said, "Opportunity next. It is the general opinion that only Mrs. Delmarre had opportunity since only she could approach her husband in actual personal presence.

"Are we sure of that? Suppose someone, other than Mrs. Delmarre, had made up his or her mind to kill Dr. Delmarre? Would not such a desperate resolution make the discomfort of personal presence secondary. If any of you were set on murder, wouldn't you bear personal presence just long enough to do the job? Couldn't you sneak into the Delmarre mansion—"

Attlebish interposed frigidly. "You are ignorant of the matter, Earthman. Whether we would or would not doesn't matter. The fact is that Dr. Delmarre himself would

not allow seeing, I assure you. If anyone came into his personal presence, regardless of how valued and long-standing a friendship there was between them, Dr. Delmarre would order him away and, if necessary, call robots to help with the ejection."

"True," said Baley, "if Dr. Delmarre were aware that personal presence was involved."

"What do you mean by that?" demanded Dr. Thool, in surprise, his voice quavering.

"When you treated Mrs. Delmarre at the scene of the murder," replied Baley, looking full at his questioner, "she assumed you were viewing her, until you actually touched her. So she told me and so I believe. I am, myself, accustomed only to seeing. When I arrived at Solaria and met Security Head Gruer, I assumed I was seeing him. When at the end of our interview, Gruer disappeared, I was taken completely by surprise."

"Now assume the reverse. Suppose that for all a man's adult life, he had been viewing only; never seeing anyone, except on rare occasions his wife. Now suppose someone other than his wife walked up to him in personal presence. Would he not automatically assume that it was a matter of viewing, particularly if a robot had been instructed to advise Delmarre that viewing contact was being set up?"

"Not for a minute," said Quemot. "The sameness of background would give it away."

"Maybe, but how many of you are aware of background now? There would be a minute or so, at least, before Dr. Delmarre would grow aware that something was wrong and in that time, his friend, whoever he was, could walk up to him, raise a club and bring it down."

"Impossible," said Quemot, stubbornly.

"I think not," said Baley. "I think opportunity must be canceled out as absolute proof that Mrs. Delmarre is the murderess. She had opportunity, but so might others."

Baley waited again. He felt perspiration on his forehead, but wiping it away would have made him look weak. He must maintain absolute charge of the proceedings. The person at whom he was aiming must be placed in self-convinced inferiority.

Baley looked from face to face and decided that matters were at least progressing satisfactorily. Even Attlebish looked quite humanly concerned.

"And so we come," he said, "to means, and that is the most puzzling factor of all. The weapon with which the murder was committed was never found."

"We know that," said Attlebish. "If it were not for that point, we would have considered the case against Mrs. Delmarre conclusive. We would never have required an investigation."

"Perhaps," said Baley. "Let's
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analyze the matter of means, then. There are two possibilities. Either Mrs. Delmarre committed the murder, or someone else did. If Mrs. Delmarre committed the murder, the weapon would have had to remain at the scene of the crime, unless it were removed later. It has been suggested by my partner, Mr. Olivaw of Aurora, who is not present at the moment, that Dr. Thool had the opportunity to remove the weapon. I ask Dr. Thool now, in the presence of all of us, if he did this, if he removed a weapon while examining the unconscious Mrs. Delmarre."

Dr. Thool was shaking. "No, no. I swear it. I'll abide any questioning. I swear I removed nothing."

Baley said, "Is there anyone who wishes to suggest at this point that Dr. Thool is lying?"

There was a silence, during which Leebig looked at an object outside of Baley's field of vision and muttered something about the time.

Baley said, "The second possibility is that someone else committed the crime and carried the weapon off with him. But if that were so, one must ask why. Carrying the weapon away is an advertisement of the fact that Mrs. Delmarre was not the murderess. If an outsider were the murderer, he would have to be a complete imbecile not to leave the weapon with the corpse to convict Mrs. Delmarre. Either way then, *the weapon must be there!* Yet it was not seen."

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Attlebish said, "Do you take us for fools or for blind men?"

"I take you for Solarians," said Baley, calmly, "and therefore incapable of recognizing the particular weapon that was left at the scene of the crime as a weapon."

"I don't understand a word," muttered Kloitta in distress.

Even Gladia, who had scarcely moved a muscle during the course of the meeting, was staring at Baley in surprise.

Baley said, "Dead husband and unconscious wife were not the only individuals on the scene. There was also a disorganized robot."

"Well?" said Leebig, angrily.

"Isn't it obvious, then, that having eliminated the impossible, what remains, however improbable, is the truth. The robot at the scene of the crime was the murder weapon, a murder weapon none of you could recognize by force of your training.

They all talked at once; all but Gladia, who simply stared.

Baley raised his arms. "Hold it. Quiet! Let me explain!" And once again, he told the story of the attempt on Gruer's life and the method by which it could have been accomplished. This time, he added the attempt on his own life at the baby farm.

Leebig said, impatiently, "I suppose that was managed by having one robot poison an arrow without knowing it was using poison, and having a second robot hand the poisoned arrow to the boy after telling



him that you were an Earthman, without its knowing that the arrow was poisoned."

"Something like that. Both robots would be completely instructed."

"Very farfetched," said Leebig.

Quemot was pale and looked as though he might be sick at any moment. "No Solarian could possibly use robots to harm a human."

"Maybe so," said Baley with a shrug, "but the point is that robots can be so manipulated. Ask Dr. Leebig. He is the roboticist."

Leebig said, "It does not apply to the murder of Dr. Delmarre. I told you that yesterday. How can anyone arrange to have a robot smash a man's skull?"

"Shall I explain how?"

"Do so if you can."

Baley said, "It was a new model robot that Dr. Delmarre was testing. The significance of that wasn't plain to me until last evening when I had occasion to say to a robot, in asking for his help in rising out of a chair, 'Give me a hand!' The robot looked at his own hand in confusion as though he thought he were expected to detach it and give it to me. I had to repeat my order less idiomatically. But it reminded me of something Dr. Leebig had told me earlier that day. There was experimentation among robots with replaceable limbs.

"Suppose this robot that Dr. Delmarre had been testing was one such, capable of using any of a number of interchangeable limbs of

various shapes for different kinds of specialized tasks. Suppose the murderer knew this and suddenly said to the robot, 'Give me your arm.' The robot would detach its arm and give it to him. The detached arm would make a splendid weapon. With Dr. Delmarre dead, it could be snapped back into place."

Stunned horror gave way to a babble of objection as Baley talked. His last sentence had to be shouted and even so was all but drowned out.

Attlebish, face flushed, raised himself from his chair and stepped forward. "Even if what you say is so, then Mrs. Delmarre is the murderess. She was there, she quarreled with him, she would be watching her husband working with the robot and would know of the replaceable limb situation—which I don't believe, by the way. No matter what you do, Earthman, everything points to her."

Gladia began to weep softly.

Baley did not look at her. He said, "On the contrary, it is easy to show that whoever committed the murder, Mrs. Delmarre did not."

Jothan Leebig suddenly folded his arms and allowed an expression of contempt to settle on his face.

Baley caught that and said, "You'll help me do so, Dr. Leebig. As a roboticist, you know that maneuvering robots into actions such as indirect murder takes enormous skill. I had occasion yesterday

to try to put an individual under house arrest. I gave three robots detailed instructions intended to keep this individual safe. It was a simple thing, but I am a clumsy man with robots. There were loopholes in my instructions and my prisoner escaped."

"Who was the prisoner?" demanded Attlebish.

"Beside the point," said Baley, impatiently. "What *is* the point is the fact that amateurs can't handle robots well. And some Solarians may be pretty amateurish as Solarians go. For instance, what does Gladia Delmarre know about robotics? Well, Dr. Leebig?"

"What?" The roboticist stared.

"You tried to teach Mrs. Delmarre robotics. What kind of a pupil was she? Did she learn anything?"

Leebig looked about uneasily. "She didn't—" and stalled.

"She was completely hopeless, wasn't she? Or would you prefer not to answer?"

Leebig said stiffly, "She might have pretended ignorance."

"Are you prepared to say, as a roboticist, that you think Mrs. Delmarre is sufficiently skilled to drive robots to indirect murder?"

"How can I answer that?"

"Let me put it another way. Whoever tried to have me killed at the baby farm must have had to locate me by using inter-robot communications. After all, I told no human where I was going and only the robots who conveyed me from point

to point knew of my whereabouts. My partner, Daeel Olivaw, managed to trace me later in the day but only with considerable difficulty. The murderer, on the other hand, must have done it easily, since in addition to locating me, he had to arrange for arrow-poisoning and arrow-shooting, all before I left the farm and moved on. Would Mrs. Delmarre have the skill to do that?"

Corwin Attlebish leaned forward. "Whom do you suggest would have the necessary skill, Earthman?"

Baley said, "Dr. Jothan Leebig is self-admittedly the best robot man on the planet."

"Is that an accusation?" cried Leebig.

"Yes!" shouted Baley.

The fury in Leebig's eyes faded slowly. It was replaced not by calm, exactly, but by a kind of clamped-down tension. He said, "I studied the Delmarre robot after the murder. It had no detachable limbs. At least, they were detachable only in the usual sense of requiring special tools and expert handling. So the robot wasn't the weapon used in killing Delmarre and you have no argument."

Baley said, "Who else can vouch for the truth of your statement?"

"My word is not to be questioned."

"It is here. I'm accusing you and your unsupported word concerning the robot is valueless. If someone else will bear you out, that would be different. Incidentally, you dis-

posed of that robot quickly. Why?"

"There was no reason to keep it. It was completely disorganized. It was useless."

"Why?"

Leebig shook his finger at Baley and said violently, "You asked me that once before, Earthman, and I told you why. It had witnessed a murder which it had been powerless to stop."

"And you told me that that always brought about complete collapse; that that was a universal rule. Yet when Gruer was poisoned, the robot that had presented him with the poisoned drink was harmed only to the extent of a limp and a lisp. It had actually itself been the agent of what looked like murder at the moment, and not merely a witness, and yet it retained enough sanity to be questioned."

"This robot, the robot in the Delmarre case, must have been still more intimately concerned with murder than the Gruer robot. This Delmarre robot must have had its own arm used as the murder weapon."

"All nonsense," gasped out Leebig. "You know nothing about robotics."

Baley said, "That's as may be. But I will suggest that Security Head Attlebish impound the records of your robot factory and maintenance shop. Perhaps we can find out whether you have built robots with detachable limbs and, if so, whether any were sent to Dr. Delmarre, and, if so, when."

"No one will tamper with my records," cried Leebig.

"Why? If you have nothing to hide, why?"

"But why on Solaria should I want to kill Delmarre? Tell me that. What's my motive?"

"I can think of two," said Baley. "You were friendly with Mrs. Delmarre. Overly friendly. Solarians are human after a fashion. You never consorted with women but that didn't keep you immune from, shall we say, animal urges. You saw Mrs. Delmarre . . . I beg your pardon, you viewed her . . . when she was dressed rather informally and—"

"No," cried Leebig in agony.

And Gladia whispered energetically, "No."

"Perhaps you didn't recognize the nature of your feelings yourself," said Baley, "or if you had a dim notion of it, you despised yourself for your weakness, and hated Mrs. Delmarre for inspiring it. And yet you might have hated Delmarre, too, for having her. You did ask Mrs. Delmarre to be your assistant. You compromised with your libido that far. She refused and your hatred was the keener for that. By killing Dr. Delmarre in such a way as to throw suspicion on Mrs. Delmarre, you could be avenged on both at once."

"Who would believe that cheap, melodramatic filth?" demanded Leebig in a hoarse whisper. "Another Earthman, another animal, maybe. No Solarian."

"I don't depend on that motive,"

said Baley. "I think it was there, unconsciously, but you had a plainer motive, too. Dr. Rickain Delmarre was in the way of your plans, and had to be removed."

"What plans?" demanded Leebig.

"Your plans aiming at the conquest of the galaxy, Dr. Leebig," said Baley.

XVIII

"The Earthman is mad," cried Leebig, turning to the others. "Isn't that obvious?"

Some stared at Leebig, wordlessly, some at Baley.

Baley gave them no chance to come to decisions. He said, "You know better, Dr. Leebig. Dr. Delmarre was going to break off with you. Mrs. Delmarre thought it was because you wouldn't marry. I don't think so. Dr. Delmarre himself was planning a future in which ectogenesis would be possible and marriage unnecessary. But Dr. Delmarre was working with you; he would know, and guess, more about your work than anyone else. He would know if you were attempting dangerous experiments, and he would try to stop you. He hinted about such matters to Agent Gruer, but gave no details, because he was not yet certain of the details. Obviously, you discovered his suspicions and killed him."

"Mad!" said Leebig, again. "I will have nothing more to do with this."

But Attlebish interrupted. "Hear him out, Leebig!"

Baley bit his lip to keep from a premature display of satisfaction at the obvious lack of sympathy in the Security Head's voice. He said, "In the same discussion with me in which you mentioned robots with detachable limbs, Dr. Leebig, you mentioned spaceships with built-in positronic brains. You were definitely talking too much, then. Was it that you thought I was only an Earthman and incapable of understanding the implications of robotics? Or was it that you had just been threatened with personal presence, had the threat lifted, and were a little delirious with relief? In any case, Dr. Quemot had already told me that the secret weapon of Solaria against the Outer Worlds was the positronic robot."

Quemot, thus unexpectedly referred to, started violently, and cried, "I meant—"

"You meant it sociologically, I know. But it gives rise to thoughts. Consider a spaceship with a built-in positronic brain as compared to a manned spaceship. A manned spaceship could not use robots in active warfare. A robot could not destroy humans on enemy spaceships, or on enemy worlds. It could not grasp the distinction between friendly humans and enemy humans.

"Of course, a robot could be told that the opposing spaceship had no humans aboard. It could be told that it was an uninhabited planet that was being bombarded. That

would be difficult to manage. A robot could see that its own ship carried humans; it would know its own world held humans. It would assume that the same was true of enemy ships and worlds. It would take a real expert in robotics, such as you, Dr. Leebig, to handle them properly in that case, and there are very few such experts.

"But a spaceship that was equipped with its own positronic brain would cheerfully attack any ship it was directed to attack, it seems to me. It would naturally assume all other ships were unmanned. A positronic-brained ship could easily be made incapable of receiving messages from enemy ships that might undeceive it. With its weapons and defenses under the immediate control of a positronic brain, it would be more maneuverable than any manned ship. With no room necessary for crewmen, for supplies, for water or air-purifiers, it could carry more armor, more weapons and be more invulnerable than any ordinary ship. One ship with a positronic brain could defeat fleets of ordinary ships. Am I wrong?"

The last question was shot at Dr. Leebig, who had risen from his seat and was standing, rigid, almost cataleptic with—what? Anger? Horror?

There was no answer. No answer could have been heard. Something tore loose and the others were yelling madly. Kloitta had the face of a fury and even Gladia was on

her feet, her small fist beating the air threateningly.

And all had turned on Leebig.

Baley relaxed and closed his eyes. He tried for just a few moments to un-knot his muscles, unfreeze his tendons.

It had worked. He had pressed the right button at last. Quemot had made an analogy between the Solarian robots and the Spartan helots. He said the robots could not revolt so that the Solarian could relax.

But what if some human threatened to teach the robots how to harm humans; to make them, in other words, capable of revolting.

Would that not be the ultimate crime? On a world such as Solaria would not every last inhabitant turn fiercely against anyone even suspected of making a robot capable of harming a human; on Solaria, where robots outnumbered humans by twenty thousand to one?

Attlebish cried, "You are under arrest. You are absolutely forbidden to touch your books or records until the government has a chance to inspect them—" He went on, almost incoherent, scarcely heard in the pandemonium.

A robot approached Baley. "A message, master, from the master Olivaw."

Baley took the message gravely, turned and cried, "One moment."

His voice had an almost magical effect. All turned to look at him solemnly and in no face—outside Leebig's frozen glare—was there

any sign of anything but the most painful attention to the Earthman.

Baley said, "It is foolish to expect Dr. Leebig to leave his records untouched while waiting for some official to reach them. So even before this interview began, my partner, Daneel Olivaw, left for Dr. Leebig's estate. I have just heard from him. He is on the grounds now and will be with Dr. Leebig in a moment in order that he may be put under restraint."

"*Restraint!*" howled Leebig, in an almost animal terror. His eyes widened into staring holes in his head. "Someone coming here? Personal presence? No! No!" The second "No" was a shriek.

"You will not be harmed," said Baley, coldly, "if you co-operate."

"But I won't see him. I can't see him." The roboticist fell to his knees without seeming aware of the motion. He put his hands together in a desperate clasped gesture of appeal. "What do you want? Do you want a confession? Delmarre's robot had detachable limbs. Yes. Yes. Yes. I arranged Gruer's poisoning. I arranged the arrow meant for you. I even planned the spaceships as you said. I haven't succeeded, but, yes, I planned it. Only keep the man away. Don't let him come. Keep him away!"

He was babbling.

Baley nodded. Another right button. The threat of personal presence would do more to induce confession than any physical torture.

But then, at some noise or move-

ment outside the field of sound or vision of any of the others, Leebig's head twisted and his mouth opened. He lifted a pair of hands, holding something off.

"Away," he begged. "Go away. Don't come. Please don't come. Please—"

He scrambled away on hands and knees, then his hand went suddenly to a pocket in his jacket. It came out with something and moved rapidly to his mouth. Swaying twice, he fell prone.

Baley wanted to cry: You fool, it isn't a human that's approaching; only one of the robots you love.

Daneel Olivaw darted into the field of vision and for a moment, stared down at the crumpled figure.

Baley held his breath. If Daneel should realize it was his own pseudo-humanity that had killed Leebig, the effect on his First-Law-enslaved brain might be drastic.

But Daneel only knelt and his delicate fingers touched Leebig here and there. Then he lifted Leebig's head as though it were infinitely precious to him, cradling it, caressing it."

His beautifully-chiseled face stared out at the others and he whispered, "A human is dead!"

Baley was expecting her; she had asked for a last interview; but his eyes widened when she appeared.

He said, "I'm seeing you."

"Yes," said Gladia, "how can you tell?"

"You're wearing gloves."

"Oh." She looked at her hands in confusion. Then, softly, "Do you mind?"

"No, of course not. But why have you decided to see, rather than view."

"Well," she smiled weakly, "I've got to get used to it, don't I, Elijah? I mean, if I'm going to Aurora."

"Then it's all arranged?"

"Mr. Olivaw seems to have influence. It's all arranged. I'll never come back."

"Good. You'll be happier, Gladia. I know you will."

"I'm a little afraid."

"I know. It will mean seeing all the time and you won't have all the comforts you had on Solaria. But you'll get used to it and, what's more, you'll forget all the terror you've been through."

"I don't want to forget everything," said Gladia, softly.

"You will." Baley looked at the slim girl who stood before him and said, not without a momentary pang, "And you will be married some day, too. Really married, I mean."

"Somehow," she said, mournfully, "that doesn't seem so attractive to me—right now."

"You'll change your mind."

And they stood there, looking at each other for a wordless moment.

Gladia said, "I've never thanked you."

Baley said, "It was only my job."

"You'll be going back to Earth now, won't you?"

"Yes."

"I'll never see you again."

"Probably not. But don't feel badly about that. In forty years at most, I'll be dead and you won't look a bit different from the way you do now."

Her face twisted. "Don't say that."

"It's true."

She said, rapidly, as though forced to change the subject, "It's all true about Jothan Leebig, you know."

"I know. Other roboticists went over his records and found experiments toward unmanned intelligent spaceships. They also found other robots with replaceable limbs."

Gladia shuddered, "Why did he do such a horrible thing, do you suppose?"

"He was afraid of people. He killed himself to avoid personal presence and he was ready to kill other worlds to make sure that Solaria and its personal presence tabu would never be touched."

"How could he feel so," she murmured, "when personal presence can be so very—"

Again a silent moment while they faced each other at ten paces.

Then Gladia cried suddenly, "Oh, Elijah, you'll think it abandoned of me."

"Think what abandoned?"

"May I touch you? I'll never see you again, Elijah."

"If you want to." He felt half-throttled.

Step by step, she came closer, her eyes glowing, yet looking ap-

prehensive, too. She stopped three feet away, then slowly, as though in a trance, she began to remove the glove on her right hand.

Baley started a restraining gesture. "Don't be foolish, Gladia."

"I'm not afraid," said Gladia.

Her hand was bare. It trembled as she extended it.

And so did Baley's as he took her hand in his. They remained so for one moment, her hand a shy thing, frightened as it rested in his. He opened his hand and hers escaped, darted suddenly and without warning toward his face until her fingertips rested feather-light upon his cheek for the barest moment.

She said, "Thank you, Elijah. Good-by."

He said, "Good-by, Gladia," and watched her leave.

Even the thought that a ship was waiting to take him back to Earth did not wipe out the sense of loss he felt at that moment.

Undersecretary Albert Minnim's look was intended to be one of prim welcome. "I am glad to see you back on Earth. Your report, of course, arrived before you did and is being studied. You did a good job. The matter will look well in your record."

"Thank you," said Baley. There was no room for elation in him. Being back on Earth; being safe in the Caves; being in hearing distance of Jessie's voice—he had spoken to her already—had left him strangely empty.

"However," said Minnim, "your report concerned only the murder investigation. There was another matter we were interested in. May I have a report on that, verbally?"

Baley hesitated and his hand moved automatically toward the inner pocket where the warm comfort of his pipe could once more be found.

Minnim said at once, "You may smoke, Baley."

Baley made of the lighting process a rather drawn-out ritual. He said, "I am not a sociologist."

"Aren't you?" Minnim smiled briefly. "It seems to me that a successful detective must be a good rule-of-thumb sociologist even if he never heard of Hackett's Equation. I think, from your discomfort at the moment, that you have notions concerning the Outer Worlds but aren't sure how it will sound to me?"

"If you put it that way, sir—When you ordered me to Solaria, you asked a question; you asked what the weakness of the Outer Worlds were. Their strengths were their robots, their low population, their long lives, but what were their weaknesses?"

"Well?"

"I believe I know the weaknesses of the Solarians, sir."

"You can answer my question? Good. Go ahead."

"Their weaknesses, sir, are their robots, their low population, their long lives."

Minnim stared at Baley without

any change of expression. His hands worked in jerky finger-drawn designs along the papers on his desk.

He said, "Why do you say that?"

Baley had spent hours organizing his thoughts on the way back from Solaria; had confronted officialdom, in imagination, with balanced, well-reasoned arguments. Now he felt at a loss.

He said, "I'm not sure I can put them clearly."

"No matter. Let me hear. This is first approximation only."

Baley said, "The Solarians have given up something mankind has had for a million years; something worth more than atomic power, cities, agriculture, tools, fire, everything; because it's something that made everything else possible."

"I don't want to guess, Baley. What is it?"

"The tribe, sir. Co-operation between individuals. Solaria has given it up entirely. It is a world of isolated individuals and the planet's only sociologist is delighted that this is so. That sociologist, by the way, never heard of socio-mathematics, because he is inventing his own science. There is no one to teach him, no one to help him, no one to think of something he himself might miss. The only science that really flourishes on Solaria is robotics and there are only a handful of men involved in that, and when it came to an analysis of the interaction of robots and men, they had to call in an Earthman to help.

"Solarian art, sir, is abstract. We

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have abstract art on Earth as *one* form of art; but on Solaria it is the *only* form. The human touch is gone. The looked-for future is one of ectogenesis and complete isolation from birth."

Minnim said, "It all sounds horrible. But is it harmful?"

"I think so. Without the interplay of human against human, the chief interest in life is gone; most of the intellectual values are gone; most of the reason for living is gone. Viewing is no substitute for seeing. The Solarians, themselves, are conscious, that viewing is a long-distance sense.

"And if isolation isn't enough to induce stagnation, there is the matter of their long lives. On Earth, we have a continuous influx of young people who are willing to change because they haven't had time to grow hard-set in their ways. I suppose there's some optimum. A life long enough for real accomplishment and short enough to make way for youth at a rate that's not too slow. On Solaria, the rate is too slow."

Minnim still drew patterns with his finger. "Interesting! Interesting!" He looked up, and it was as though a mask had fallen away. There was glee in his eyes. "Plain-clothesman, you're a man of penetration."

"Thank you," said Baley, stiffly.

"Do you know why I encouraged you to describe your views to me?" He was almost like a little boy, hugging his pleasure. He went on

without waiting for an answer. "Your report has already undergone preliminary analysis by our sociologists and I was wondering if you had any idea yourself as to the excellent news for Earth you had brought with you. I see you have."

"But wait," said Baley. "There's more to this."

"There is, indeed," agreed Minnim jubilantly. "Solaria cannot possibly correct its stagnation. It has passed a critical point and their dependence on robots has gone too far. Individual robots can't discipline an individual child, even though discipline may do the child eventual good. The robot can't see past the immediate pain. And robots collectively cannot discipline a planet by allowing its institutions to collapse when the institutions have grown harmful. They can't see past the immediate chaos. So the only end for the Outer Worlds is perpetual stagnation and Earth will be freed of their domination."

"Wait," said Baley again, more loudly. "It's only Solaria we're discussing, not any other Outer World."

"It's the same thing. Your Solarian sociologist . . . Kimot—"

"Quemot, sir."

"Quemot, then. He said, did he not, that the other Outer Worlds were moving in the direction of Solaria?"

"He did, but he knew nothing about the other Outer Worlds first-hand, and he was no sociologist.

Not really. I thought I made that clear."

"Our own men will check."

"They'll lack data, too. We know nothing about the really big Outer Worlds. Aurora, for instance; Daneel's world. To me, it doesn't seem reasonable to expect them to be anything like Solaria. In fact, there's only one world in the galaxy which resembles Solaria—"

Minnim was dismissing the subject with a small happy wave of his neat hand. "Our men will check. I'm sure they will agree with Quemot."

Baley's stare grew somber. If Earth's sociologists were anxious enough for happy news, they would find themselves agreeing with Quemot, at that. Anything could be found in figures if the search was long enough and hard enough and if the proper pieces of information were ignored or overlooked.

He hesitated. Was it now time to speak while he had the ear of a man high in the government or—

He hesitated a trifle too long. Minnim was speaking again, shuffling a few papers and growing more matter-of-fact. "A few minor matters, plainclothesman, concerning the Delmarre case itself and then you will be free to go. Did you intend to have Leebig commit suicide?"

"I intended to force a confession, sir. I had not anticipated suicide at the approach, ironically, of someone who was only a robot and who would not really be violating the

taboo against personal presence. But, frankly, I don't regret his death. He was a dangerous man. It will be a long time before there will be another man who will combine his sickness and his brilliance."

"I agree with that," said Minnim, dryly, "and consider his death fortunate, but didn't you consider your danger if the Solarians had stopped to realize that Leebig couldn't possibly have murdered Delmarre?"

Baley took his pipe out of his mouth and said nothing.

"Come, plainclothesman," said Minnim. "You know he didn't. The murder required personal presence and Leebig would die rather than allow that. He *did* die rather than allow it."

Baley said, "You're right, sir. I counted on the Solarians being too horrified at his misuse of robots to stop to think of that."

"Then who did kill Delmarre?"

Baley said, slowly, "If you mean who struck the actual blow, it was the person everyone knew had done so. Gladia Delmarre, the man's wife."

"And you let her go?"

Baley said, "Morally, the responsibility wasn't hers. Leebig knew Gladia quarreled bitterly with her husband, and often. He must have known how furious she could grow in moments of anger. Leebig wanted the death of the husband under circumstances that would incriminate the wife. So he supplied Delmarre with a robot and, I imagine, instructed it with all the skill

he possessed to hand Gladia one of its detachable limbs at the moment of her full fury. With a weapon in her hand at the crucial moment, she acted in a temporary black-out before either Delmarre or the robot could stop her. Gladia was as much Leebig's unwitting instrument as the robot itself."

Minnim said, "The robot's arm must have been smeared with blood and matted hair."

"It probably was," said Baley, "but it was Leebig who took the murder robot in charge. He could easily have instructed any other robots who might have noticed the fact to forget it. Dr. Thool might have noticed it, but he inspected only the dead man and the unconscious woman. Leebig's mistake was to think that guilt would rest so obviously on Gladia that the matter of the absence of an obvious weapon at the scene wouldn't save her. Nor could he anticipate that an Earthman would be called in to help with the investigation."

"So with Leebig dead, you arranged to have Gladia leave Solaria. Was that to save her in case any Solarians began thinking about the case?"

Baley shrugged. "She had suffered enough. She had been victimized by everyone; by her husband, by Leebig, by the world of Solaria."

Minnim said, "Weren't you bending the law to suit a personal whim?"

Baley's craggy face grew hard. "It was not a whim. I was not bound

by Solarian law. Earth's interests were paramount, and for the sake of those interests, I had to see that Leebig, the dangerous one, was dealt with. As for Mrs. Delmarre," he faced Minnim now, and felt himself taking a crucial step. He *had* to say this. "As for Mrs. Delmarre, I made her the basis of an experiment."

"What experiment?"

"I wanted to know if she would consent to face a world where personal presence was permitted and expected. I was curious to know if she had the courage to face disruption of habits so deeply settled in her. I was afraid she might refuse to go; that she might insist on remaining on Solaria, which was purgatory to her, rather than bring herself to abandon her distorted Solarian way of life. But she chose change and I was glad she did, because to me it seemed symbolic. It seemed to open the gates of salvation for *us*."

"For *us*?" said Minnim, with energy. "What the devil do you mean?"

"Not for you and I, particularly, sir," said Baley, gravely, "but for all mankind. You're wrong about the other Outer Worlds. They have few robots; they permit personal presence; and they have been investigating Solaria. R. Daneel Olivaw was there with me, you know, and he'll bring back a report. There is a danger there they may become Solarias some day but they will probably

recognize that danger and work to keep themselves in a reasonable balance and in that way remain the leaders of mankind."

"That is your opinion," said Minnim, testily.

"And there's more to it. There *is* one world like Solaria and that's Earth."

"Plainclothesman Baley!" snapped Minnim.

"It's so, sir. We're Solaria inside out. They retreated into isolation from one another. We retreated into isolation from the galaxy. They are at the dead end of their inviolable estates. We are at the dead end of underground Cities. They're leaders without followers, only robots who can't talk back. We're followers without leaders, only enclosing Cities to keep us safe." Baley's fists clenched with passion.

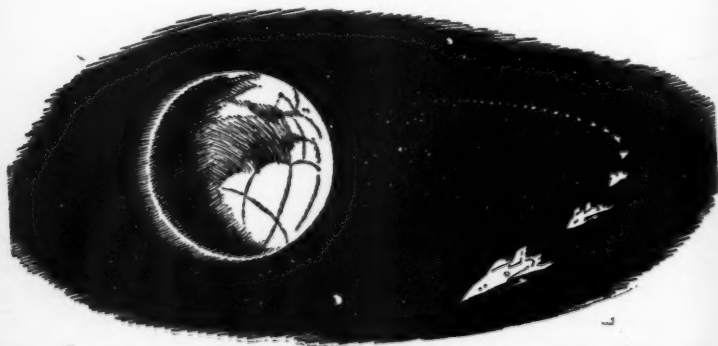
Minnim disapproved. "Plainclothesman, you have been through an ordeal. You need a rest and you will have one. A month's vacation,

full pay, and a promotion at the end of it."

"Thank you, but that's not all I want. I want you to listen. There's only one direction out of our dead end and that's outward, toward Space. There are a million worlds out there and the Spacers own only fifty. They are few and long-lived. We are many and short-lived. We are better suited than they for exploration and colonization. We have population pressure to push us and a rapid turnover of generation to keep us supplied with the young and reckless. It was our ancestors who colonized the Outer Worlds in the first place."

"Yes, I see—but I'm afraid our time is up."

Baley could feel the other's anxiety to be rid of him and he remained stolidly in place. He said, "When the original colonization established worlds superior to our own in technology, we escaped by building wombs beneath the ground



for ourselves. The Spacers made us feel inferior and we hid from them. That's no answer. We must *compete* with them, follow them, if we must, lead them, if we can. To do that, we must face the open; we must teach ourselves to face the open. If it is too late to teach ourselves, then we must teach our children."

"You need a rest, plainclothesman."

"Ask the sociologists. Put it to them. And if they're in doubt, find a way to send me to Aurora. Let me bring back a report on the *real* Spacers, and you'll see what Earth must do."

Minnim nodded. "Yes, yes. Good day, now, Plainclothesman Baley."

Baley left with a feeling of exaltation. He had not expected an open victory over Minnim. Victories over ingrained patterns of thought are not won in a day or a year. But he had seen the look of pensive uncertainty that had crossed Minnim's face and blotted out, at least for a while, the earlier uncritical joy.

He felt he could see into the future. Minnim would ask the sociologists and one or two of them would be uncertain. They would wonder. They would consult Baley.

Give it one year, thought Baley, one year, and I'll be on my way to Aurora. One generation, and we'll be out in space once more.

Baley stepped onto the north-bound Expressway. Soon he would

see Jessie. Would *she* understand? And his son, Bentley, now seventeen. When Ben had a seventeen-year-old of his own, would he be standing on some empty world, building a spacious life?

It was a frightening thought. Baley still feared the open. But he no longer feared the fear! It was not something to run from, that fear, but something to fight.

Baley felt as though a touch of madness had come over him. From the very first, the open had had its weird attraction over him; from the time in the ground car when he had tricked Dancel in order to have the top lowered so that he might stand up in the open air.

He had failed to understand then. Dancel thought he was fighting the word "peculiarity." He himself thought he was facing the open out of professional necessity, to solve a crime. Only on that last evening on Solaria, with the curtain tearing away from the window, did he realize his need to face the open for the open's own sake; for its attraction and its promise of freedom.

There must be millions on Earth who would feel that same urge, if the open were only brought to their attention, if they could be made to take the first step.

He looked about.

The Expressway was speeding on. All about him was artificial light and huge banks of apartments gliding backward and flashing signs and store windows and factories and

lights and noise and crowds and more noise, and people—

It was all he had loved, all he had hated and feared to leave, all he had thought he longed for on Solaria.

And it was all strange to him.

He couldn't make himself fit back in.

He had gone out to solve a murder and something had happened to him.

He had told Minnim the Cities were wombs, and so they were. And what was the first thing a man must do before he can be a man? He must be born. He must leave the womb. And once left, the

womb could not be re-entered.

Baley had left the City and could not re-enter. The City was no longer his; the Caves of Steel were alien. This *had* to be. And it would be for others and Earth would be born again and reach outward.

His heart beat madly and the noise of life about him sank to an unheard murmur.

He remembered his dream on Solaria and he understood it at last. He lifted his head and he could see through all the steel and concrete and humanity above him. He could see the beacon set in space to lure men outward. He could see it shining down. The naked Sun!



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BY P. SCHUYLER MILLER

"ANTIPODEAL" WONDERS

One of the perennial arguments in science-fiction circles was started a number of years ago by Sam Moskowitz. Some agree, some disagree; no two people can come closer on a definition of terms than on a definition of science fiction itself, but there is a feeling abroad that Sam has something there. His statement is that something called a "sense of wonder" has been lost in modern science fiction, and that we are, therefore, failing to gain recruits as we did a generation ago.

As it happens, a little book by

Aldous Huxley, immortal in our circles as the author of "Brave New World," may cast some light in the matter. Its title: "Heaven and Hell" (Harper & Brothers, 103 pages, \$2.00). Its subject: the experiences which Huxley calls "the antipodes of everyday consciousness."

As you may or may not know, the author has experimented quite extensively with the mental effects of various drugs, especially mescaline, the narcotic in the peyote cactus. He has reported on this in his book "The Doors of Perception," published about two years ago. Now, in this little essay between covers,

he is theorizing from his mescaline experiences. In so doing, he suggests grounds for believing that there is a real physical-psychological basis for the "sense of wonder" and that it is inherent in the human race.

The visions Huxley describes can be induced by such drugs as mescaline or lysergic acid, or by hypnosis. They also come "naturally" in flashes of experience, to nearly everyone. And they have common features which seem to mark them as characteristic of the human animal, rather than of certain races or cultures. They have, in other words, a biological and psychological reality.

First, in these experiences light and color are intensified beyond anything known consciously, and the mind's ability to distinguish and enjoy fine differences is also intensified. Second, the scenes and objects which appear in these visions have an intense significance of their own, almost unrelated to the verbalized "meanings" of daily life. Third, certain classes of objects appear: "pure geometry becomes concrete, and the visionary perceives . . . patterned things, such as carpets, carvings, mosaics. These give place to vast and complicated buildings, in the midst of landscapes, which change continuously, passing from richness to more intensely colored richness, from grandeur to deepening grandeur. Heroic figures . . . make their appearance . . . Fabulous animals move across the scene. Everything is novel and amazing."

These mental experiences in the

antipodes of the conscious, Huxley suggests, are responsible for the common elements in the Other Worlds and fairylands of almost all religions, the world around. On the negative side—which he discusses at length—they are also responsible for the black repulsion of the world's hells. Religious architecture and religious painting have tried to capture something of this other-worldly beauty, in order to induce in the congregation a beginning of the visionary mood which can then be heightened by the music and symbolism and ritual of the service, literally carrying each individual toward the experiences which he has inwardly identified with heaven. Jewels, by this interpretation, are treasured because they are closest to the preternatural colors of the visions; when glass became available, the medieval churches could have whole windows of such jewels.

"Whatever, in nature or in a work of art, resembles one of those intensely significant, inwardly glowing objects encountered at the mind's antipodes is capable of inducing, if only in a partial and attenuated form, the visionary experience," Huxley says.

Is this visionary experience the sense of wonder that we are seeking in science fiction?

Wherever they come from, the common elements are certainly there. The vast and complicated buildings—the unearthly landscapes, colored beyond experience—the heroic fig-

ures—the fabulous monsters—yes, and the atmosphere of hidden significance in everything that you see, everything that happens. Huxley says little or nothing about the power of words to transport the beholder as art and music do, but certainly the same effect is there. And the scenes and characters of the early books—Merritt's, Burroughs', Cummings', practically all of them—are of this kind. Consciously or unconsciously, it appears, these writers who had the "sense of wonder" in their writing were using the elements of visionary experience that are common to all men. Today you will find the same elements in the best of Bradbury.

Add another piece of circumstantial evidence. The heroic figures in the vision world, Huxley says, are usually at rest, and such figures in art usually have greater "transporting power" when they are also at rest. Immediately the great set-pieces of fantasy occur: Merritt's "Face," the half seen monsters of Hodgson's "Night Land," scores of Dunsany's creations. Lovecraft used the other side of the coin for his visions of hellishness. I know, from experience, how easy it was to begin writing fantasy by piling scene on scene in this way.

If, then, fantasies of this type are tapping something universal in the human mind, what has happened to the sense of wonder they used to produce? Why doesn't the old formula still work? Huxley's argument, applied to other examples, is that the modern world has degraded

such vision-producing experiences to the drab commonplace. "The fine point of seldom pleasure has become blunted."

In the old days, the vision-inducing treasures were rare. Royalty and nobility had them—and the people were awed. The Church had them, and the people were reverent. When few could read, the same magic was in the sound of words. But today our technological world is ablaze with gaudy colors, glittering chrome and gilt, neon lights—and as reality comes closer to vision, the desirability of the vision pales, and the ability of objects to transport one into a mentally exalted state is weakened.

If this is the case, then there is probably no point in trying to regain the old, lost wonder—because it will not appeal to the people of our technologically degraded culture. By switching from the gaudily beautiful to the visually horrible, in our atomic holocaust themes, we are using the "black" side of vision—dragging the reader to hell instead of heaven, since here, at least, reality is not likely to equal or surpass vision. This may account for the success of horror movies and sadistic detective stories. The intricate Van Vogtian entanglements, with their sense of significance within significance, infinitely repeated, may be appealing to another aspect of this antipodeal world within us. The familiar gobbledygook used to "explain" inventions or phenomena gives the same effect of great significance not quite grasped. I recall how powerful it was in

the first "Skylark of Space" stories.

From what Huxley says, we're also too well fed, on the whole, to be subject to visionary exaltation. Whether this means that the writers or the readers should eat less well, I don't know: presumably the writer can tap his own antipodes best if he is half starved, but by the same token the reader is more likely to be transported into Nirvana by what he reads. (Fasting has been the preliminary to religious exaltation, the world over: congregations who had the combination of faith and empty bellies were physically more likely to be caught up in the mood and experience of the service, whereas the well-fed Pharisees, going through the motions for the sake of conformity, experienced nothing.)

At any rate, here is a rather interesting kind of confirmation of the opinion we've all held, that fantasy satisfies some kind of basic psychological craving in most people. Or did satisfy it. If that element is lost, the wonder may be permanently gone, and only the intellectual appeal which this magazine, especially, represents, is likely to be left. Or, more likely, it will merely take better and better writers to catch the old feeling and set us to seeing the backs of our minds.

We have seen much too little of Lester del Rey lately. I know he's been writing Winston juveniles, but I haven't been getting them. He may have been using a pen name for other types of nefarious but lucrative activity such as mysteries, true confessions, ghosting, advertising or scenarios. At any rate, here he is with an excellent original novel—expanded from his classic 1942 novelette—of the type which once put him shoulder to shoulder with Ted Sturgeon for insight and humanity.

"Nerves" is the story of a blowup in an atomic power plant, some time in the future. The viewpoint is that of the plant's medical officer, Doc Ferrel. And behind the immediate medical and human problems of the explosion is the political pressure against all such atomic plants, brought to a boil by unscrupulous politicians working on the fears of the voters. On all levels, the story moves along: Ferrel meeting the moment-to-moment crises of hopelessly mangled men—Palmer, the manager, at the focus of the political maelstrom—Jorgensen, the foreman who alone knows how to check what may be a "total" blowup taking half the continent with it, buried in radioactive magma with his secret locked in his brain.

If, somehow, the dreadful growing weariness of Doc and his co-workers seems to get across better than the suspenses of the situation, maybe that's what the author intended. It's a very human book, and

NERVES, by Lester del Rey. Ballantine Books, New York. 1956. 153 pp. \$2.00; paper 35¢

it just might be made into a good movie if there weren't danger of bringing about just the public reaction that you see in the story.

HIGHWAYS IN HIDING, by George O. Smith. Gnome Press, New York. 1956. 223 pp. \$3.00

It's mighty good to have George O. back again, mixing Van Vogtian melodrama with his own particular breed of action in a rattling good yarn. The original, by the way, is from *Imagination*.

We pick up Steve Cornell as he is recovering from an automobile crash in which his fiancée has completely vanished. He begins to probe, and chances on a family of super-strong folk who have the incurable, fatal hardening of the flesh known as Mekstrom's Disease—and they disappear. He uncovers an ingenious network of "highways in hiding," marked by special road-signs along the structure of regular roads. The doctor who attended him after his crash sends him a postcard showing one of the signs—and *he* vanishes. So, presently, does a nurse who has agreed to help him unravel his problem.

All this takes place against the backdrop of a society in which telepaths and perceptives are common, and in which there are innumerable shifting "dead" spots where none of the Rhine faculties will function. Who is jockeying Steve into position

to do what, and why he is so important to all concerned, are among the mysteries unraveled with much action, some good chases, and a typically rapid juggling of individuals from one camp to the other. It's all great fun, and a few hopefuls put it on their "best" lists in hope it would be out before the deadline. It wasn't.

THE COMPLETE PROFESSOR CHALLENGER STORIES, by Sir Arthur Conan Doyle. John Murray, London. 1952. 577 pp. \$3.75

As you may recall, I have been bellowing loudly for this book ever since "The Reference Library" was opened. However, it wasn't until August Derleth and three other readers, Canadian, English and American, listed the book on their "twenty-five Best" ballots that I discovered the book had been out for four years. It's handled in this country by a small Florida publisher, Transatlantic Arts, Inc., and it's a "must" in any science-fiction library.

George Edward Challenger is one of the very few great personalities of science fiction. Along with John Carter of Mars, Tarzan, Kim Kinison the Gray Lensman, and possibly Stapledon's Odd John, we remember *him* rather than the stories about him. In Challenger's case, the terrific motion picture portrayal by Wallace Beery may have helped

stamp the wild black beard and bull-headed personality indelibly on our memory-banks. But for whatever reason, Challenger sticks, as does his contemporary Sherlock Holmes.

"The Lost World," in which we meet Challenger, Edward Malone the Irish reporter, Lord John Roxton, and the irascible Professor Summerlee, is *the* Challenger story and one of the s-f classics of all time. There may have been earlier stories in which dinosaurs and ape-men were found living in a remote corner of the unexplored jungle, but this book set the pace and the pattern. And it's oddly undated, except in minor details: a good yarn all the way through.

The blunderbuss professor fought his way through two more novels, the short "Poison Belt" and the long "Land of Mist," which follow each other chronologically, one short story, "The Disintegration Machine," and a novelette which I recall as a two-part serial in the old *Liberty*, "When the Earth Screamed." They're all here, in that order, but the two short items are out of chronological sequence. Mrs. Challenger, who died shortly before the beginning of "The Land of Mist," is alive in "The Disintegration Machine" and Malone, who was fired for his conversion to spiritualism, is still a reporter in both stories.

But to summarize, for those of you who haven't seen the later Challenger stories: In "The Poison Belt," three years after the expedition

which brought back a pterodactyl chick from the "Lost World" in South America, Challenger discovers that the Earth is going to plow through a zone of somehow poisoned ether which will wipe out all animal life. With his friends, he takes steps to watch the phenomena from a sealed room.

"The Land of Mist" is Doyle's apologia for his acceptance of spiritualism in his later life. It is the longest and most nearly plotless of the Challenger novels, and has the least of the great professor. Indeed, the book belongs to Malone and to Challenger's daughter, Enid, who appears out of thin air to join Malone in a journalistic study of ghost-hunting in its every aspect. Doyle uses this means to present replicas of what were, to him, convincing cases of the existence of life after death, ghosts, levitation, and a number of other phenomena which we would now put in the psionic hopper. It is, consequently, almost a treatise on the tenets of spiritualists and psychic researchers of Doyle's time. Needless to say, Challenger himself finally wades in to show up the fakers and is himself convinced—though Doyle is too good a writer to make Mrs. Challenger "come back."

The last two stories are entertainment again. In the first, Challenger investigates an inventor who has devised what we would now call a matter-transmitter, and who intends to sell it to a power hostile to England. Challenger solves the problem

in a completely characteristic way. And in "When the Earth Screamed" he proves his contention that our planet is a cosmic sea-urchin, browsing along through the ether with a coat of barnacles and assorted vermin. Driving an eight-mile-deep tunnel through the critter's skin, he harpoons it as vigorously as Ahab stabbed Moby Dick.

Incidentally, the jacket of the book has the title I've listed above. The book itself is simply "The Professor Challenger Stories."

CHESSBOARD PLANET, by Lewis Padgett. Galaxy Novels, New York. 1956. 124 pp. 35¢

"The Fairy Chessmen," the original version of this novel by Henry Kuttner in his "Padgett" disguise, was published here ten years ago and—with "Tomorrow and Tomorrow"—by Gnome in a hard-back edition. It's old enough and good enough so that I think this paperback reprint deserves extra space now.

You'll remember the story, if you've ever read it, as the one which begins with a doorknob opening its bright blue eye and looking at the haunted Director of Psychometrics. Presently the complications begin to thicken: the technician who floats like Mohammed's coffin—the mathematician who can will the world into nonexistence—the mutant who has extra-temporal perception—the mys-

terious agent out of Time—the struggle to solve an equation which is driving America's best minds insane—and behind it all, the concept of Fairy Chess, a game with variable rules. Short as it is, it's one of Padgett's best and a real classic.

TWO RUBLES TO TIMES SQUARE, by Guy Richards. Duell, Sloan & Pearce-Little, Brown, New York, Boston & Toronto. 1956. 249 pp. \$3.50

On the morning of November 10, 1957—or 1963, or 1968 or ?—the American people will awake to discover that lower New York, from Canal Street to the Battery, is in Russian hands. Seven ships—Victory ships, flying the American flag, and carrying the First Special Corps of the Soviet Army, under Colonel General Alexis Mikhilovich Ketov—have slipped past our coastal defenses and bloodlessly taken a quarter of the island of Manhattan and some seventy thousand of its residents.

So begins the most fantastic of the "next war" books. This is no comic-opera invasion, no "flies invading the fly-paper." Its fantasy lies in its realism, in the relentlessness with which the author hews at our national character, in the growing conviction that this bizarre stalemate could happen to us, next year or a little later.

We watch the Army, caught napping, mobilize Operation Expulsion under a barrage of conflicting public

and political pressures. Can the President order an attack on his country's greatest city, where seventy thousand people are held hostage, where millions in cash and billions in vital records are impounded? Can he believe the Soviet government's insistence that this is none of its doing, or is the New York attack a feint to cover a more massive and more final assault elsewhere? Can he, politically, order retaliation in the face of the public demand for peaceful negotiation with the invaders . . . and can he withstand the pressure from other quarters for instant, ruthless, atomic retaliation that will leave all New York a radioactive crater?

Ketov's behavior becomes more puzzling, the longer he withholds his demands. A few of his captives, including a reporter and a TV commentator, are allowed to leave and return at will. A "tourist" interchange is set up, in which the Russian troops explore New York and Americans probe and pry, fruitlessly, within the Russian lines. As the situation drags on, it becomes more and more difficult to imagine that either side will break the tension and begin shooting.

But shooting does start, after we have learned midway of the book what Ketov's motive is. At that point, the mystery element drops out, and in its place we have a "will he make it" plot with Ketov as the hero. I'm not sure that the switch is entirely successful, storywise. What is frighteningly real is the portrait of our own national personality, and

the suspicion that if a real Soviet coup put New York in Russian hands, we would be wide open to any kind of blackmail. Let's hope Ketov's evaluation of America isn't shared by the Kremlin.

THE EXPLORATION OF MARS, by
Willy Ley & Wernher von Braun.
Viking Press, New York. 1956.
176 pp. Ill. \$4.95.

This is the third of the series Viking launched with "Across the Space Frontier" and "Conquest of the Moon." Like them it is lavishly illustrated with color plates and black and whites by Chesley Bonestell, some of the best of which have been appearing as covers here and in other magazines. Textually, it's a better and more useful book than either of them.

What we get is a capsule account of how our knowledge of Mars has been obtained, then a condensed portrait of the planet complete with a series of maps showing the principal dark and light areas as they have appeared to various astronomers, and as they now seem. These, almost at a blow, make the book *the* popular reference on Mars, surpassed only by the technical works by Vaucouleurs and Antoniadi. There is, incidentally, an excellent annotated bibliography at the end.

The last half of the book is von Braun's amended project for the flight to Mars *with present fuels*.

ASTOUNDING SCIENCE FICTION

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The paintings, of course, are beautiful and beautifully printed. The reasoning and calculations are clear. The tables should enable you to go to Mars any time you can spare the time and money. It's a must book.

THE BRIGHT PHOENIX, by Harold Mead. Ballantine Books, New York. 1956. 184 pp. \$2.00; 35¢ paper.

This is the American edition of a British book which doesn't quite come up to the really excellent novels by Arthur C. Clarke and John Wyndham which have preceded it.

We have a post-War III world in which a "perfect" warless society has grown up, apparently in America, after the rest of the world has

been bombed to shreds. John Waterville is enough of a non-conformist to make a good explorer without falling foul of the State Morality officers. He has returned from "the Island" across the Atlantic, apparently England, where he has found room for a colony which will relieve population pressures at home. And to the Island he must shortly return to pave the way for the colonists.

Within this formula, the book progresses on three levels. We have Waterville's personal story—a too-brief romance with the waitress, Jenny, who disappears when he goes into the training camp only to reappear as one of the Reconditioned automata who are the slaves of his "free" world. We have the picture of his cruel society, with its carefully bred elite of super-men and women who are to found the new new world across the sea. And finally we have the Island "savages," thrown back to a dark-age economy but abundantly human. Behind the whole is the theme of the gradual humanizing of men once they are thrown on their own, out from under the pressure of the Morality squads.

It's convincing, but a bit stiff. Wyndham or Clarke would have done it better.

THEY KNEW TOO MUCH ABOUT FLYING SAUCERS, by Gray Barker. University Books, New York. 1956. 256 pp. \$3.50?

There's no price on the jacket of this book: I'm guessing at the probable assessment. The author is a former teacher, now a film distributor in Clarksburg, West Virginia, who seems to have been up to his ears in saucer-fandom for a long time. I had no idea so many organizations, with their own publications, were in existence to exploit the various facets of UFO's. Maybe the saucerians will be taking over the SF conventions.

Mr. Barker's contention is that one by one, the world over, researches into the nature of flying saucers are being choked off by officials of some kind, probably representing governments but possibly coming from some underground organization. "Underground" may even be taken literally, for the author seems quite receptive to the idea that the "Shaver mystery" ties into the saucer phenomena, along with invisible men, bad smells, and the imminent toppling of the Earth due to overloading the antarctic ice cap.

It's very convincingly written, with lots of quotation from alleged letters, telephone calls, personal conversations, suppressed publications, and such. Some of the "menace" sounds like what any red-blooded sadistic juvenile under forty or fifty might do to scare off that nut down the street who believes there are little green men in the saucers. Barker is an encompasser, not an excluder: he seems to feel that all the stories can be and must be right,

even when they seem to contradict each other.

As for me, I still want to see a saucer face to face.

NEW WORLDS OF MODERN SCIENCE, edited by Leonard Engel. Dell Publishing Co., New York. 1956. 383 pp. Ill. 35¢

Some of the best books on popular science that we have had are now coming from the paper-book publishers. Penguin Books, as you may know, have a regular series of these symposia, "Science News" and "New Biology," and one of the country's best science writers, Leonard Engel, has now put together this massive little anthology for Dell.

The thirty-five or more articles and essays which make up the collection are taken from books, newspapers, magazines, trade journals—in short, from anywhere and everywhere. There are too many to describe and discuss here. The book opens with a short section on "The World of Science": what science is, and what it is trying to do. There follow sections on "The Earth and the Universe," "Inside and Outside the Atom," "Life," "Man," and "Tomorrow." The latter, it may be said, takes the optimistic view that Man will keep ahead of his fecundity and not starve himself out of existence.

The total is no encyclopedia of present-day science, but it does offer

ASTOUNDING SCIENCE FICTION

a series of fascinating glimpses into some of the main channels and odd backwaters of the rushing stream. My one regret is that, wide as his reading has been, Mr. Engel seems not to have included this magazine in it. If he had, I am sure that several articles which have appeared here might well have gone into his anthology.

REPRINT ROUNDUP

NOT THIS AUGUST, by C. M. Kornbluth. Bantam Books, New York. 1956. 165 pp. 35¢

One of the best stories written about the United States after a Russian victory and our unconditional surrender on April 17, 1965.

TIMELINER, by Charles Eric Maine. Bantam Books, New York. 1956. 182 pp. 35¢

In which Hugh Macklin begins to live out a strange destiny in future after future to the end of Time.

STAR BRIDGE, by Jack Williamson & James E. Gunn. Ace Books, New York. 1956. 255 pp. 35¢

Not an Ace Double: Alan Horn's struggle against the Golden Folk of the star-empire of Eron, aided by Wu and his parrot, Lil.

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(Continued from page 7)

as a real problem. The difficulty is that when working in a field in which that problem exists . . . it's dangerously easy to insist that any unpleasantly difficult problem you're faced with belongs in that class.

And psychologists have, unfortunately, fallen into that trap; they maintain that *all* human personality traits are of that type, that *no* personality trait is subject to rigorous statement and analysis. Under such conditions, *no mathematical* (i.e., rigor of analytical technique) system could exist.

The consequence is that the humanic sciences have actually held "Mathematical techniques—other than statistics—are not applicable to humanics problems . . . and furthermore, the problem is of such a nature as to make rigorous analysis inherently impossible."

It has a suspicious ring of "We can't use the techniques you have . . . and furthermore, we don't want you to develop one we can use!"

Could this be the case? Could it be that they actually, subconsciously perhaps, do not want an effective rigor of analysis?

Put it this way: If they actually do want a rigor of analysis of humanic problems—they're the only human beings on the planet who do. And being in such an extremely small minority, they would be very efficiently and rapidly disposed of by the enraged majority. I can think of very few things that could be markedly more dangerous than pre-

sending a valid, effective, rigorous discipline of analysis of humanics problems; it would make the hydrogen bomb a soothing opiate, quieting away Man's turmoil, by comparison. Sol going nova might be more violent, or a collision of two stars, but not many things . . .

Why?

A rigorous method of analysis in any field allows accurate prediction of cause-effect relationships in that field. Accurate prophets become possible when rigorous and accurate analysis of the forces involved is possible. One who knows the cause-effect relationships in a system can control that system to a high degree. Physicists demonstrate this every day; engineers make a profession of it. There is no freedom of choice in a well-engineered system; the outcomes are predetermined.

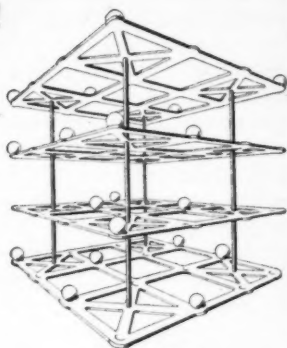
If humanic problems could be submitted to rigorous analysis—your freedom of opinion in those areas would be terminated. The "right to my own opinion" would be a limited right, with limits very precisely prescribed by the mathematics of purposive actions. Willy-nilly, like-it-or-not, you would *have* to accept the "opinions" resulting from an accurate, valid and functional mathematics of purposive action. (Agreed no such system exists; we're discussing the results entailed if such a correct, accurate system were made available.)

The question reduces to this: Do

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you prefer freedom to have your own opinion . . . or to have a method of determining the exact and conclusive truth? (With the realization that your own opinion is probably inadequate, mistaken, but very, very, precious.)

Such a mathematics wouldn't reduce to a single-opinion answer, either; there is every indication that an exact and accurate mathematics of purposive action would, in fact, yield descriptions of a family of equally tenable, equally valid, opinion-lines. Any valid disciplined analysis must include observational facts; it is an observational fact that "being a doctor" and "being a transportation company executive" are equally necessary functions in so-

MATHEMATICS OF PSYCHOLOGY

ciety, in the group-organism of a culture. Therefore we can predict that an accurate descriptive analysis of sociology would yield the conclusion that the two opinions: "It is sound to become a doctor," and "It is sound to become a transportation company executive" would be parallel, isoevaluative conclusions.

This fact in itself would, of course, cause violent emotional upheavels in human beings. A major part of our present—and anything but disciplined—cultural thinking holds that "There is Only One Right Way!" so a rigorous analysis that forced men to accept that there were several equally valid right ways would be considered by large numbers of people as a violent depriva-

tion of their right to their own opinion.

The difficulty with this problem is that "I have as much right to my opinion as you have to yours!" is a statement implying "All opinions are equally valid," while the statement "There's only one right answer!" implies that only one opinion at a time can be valid. It happens that *not all* opinions are valid, and that *more than one* opinion is valid most of the time.

That, of course, puts the problem of opinion entirely outside of logic; logic can work when, and only when, *all* the data is available. It will, then, work properly if "All opinions are equally valid," or

when "No other opinion is valid," but reduces to complete indeterminacy in any intermediate situation. The first case is "All O's are V," and the second is "Everything in the universe is either O, or not-O." Both are readily manipulated by logic. But the situation "Some O's are V, but some are not-V," is logically impossible to handle.

Logic can handle the situation "O's and only O's are valid," but cannot handle the situation "O's are V, and not-O's are also V."

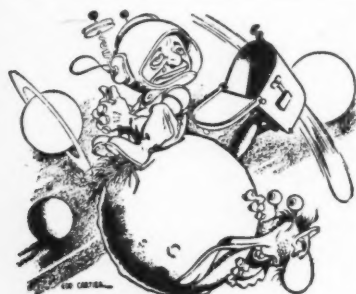
Mathematics is simply purified and highly formalized logic. It cannot handle problems in which symbols have more than one meaning, and that meaning varies in such a way that the symbol can, at one and the same time, have two different values. It can't handle "Some O's are V, and some not-O's are V, but some O's are not-V and some not-O's are not-V."

But that, of course, is the most fundamental problem of humanic science!

Try discussing logically the proposition "F is neither true, nor not-true," or "T is neither real nor not-real."

But that is the great, fundamental realization that differentiates purposive action from non-purposive action. "F" above stands for "Future," and "T" stands for "tomorrow." Purposive action inherently involves consideration of *Future consequences*; living organisms differ from the domain of physical

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science in that they act purposively—they seek to project into the future a status that exists in the present, and act *now* in a manner determined by their *prediction of the future*. A Man's action is determined not only by the past, and the present situation, but by his predictions of the future. The consequence is that the neither-real-nor-not-real Future is a real factor in determining his actions *now*!

No mathematical analysis of living behavior can be adequate unless it can accurately manipulate not-reality terms like Future.

Many times the clear expression of a problem requires that it be stated in harsh and brutal terms; the primitive violence of such a statement can reduce the complexities to simple, understandable factors. (This can also be stated as, "If the signal level is high enough, the noise can be made entirely unimportant.")

Reducing the problem of human interactions to a simple, brutal statement clarifies the factors involved that are essentially beyond the

scope of logic or mathematical analysis.

A *voyeur* is a sex deviant who has a compulsion to watch, but not participate in the sex act.

Suppose a couple of high school kids start out on a date at the drive-in movie. They're a bit early, and park for a few minutes on the way. A *voyeur* comes along, and at gun-point forces them to leave the car, strip, and forces the boy to rape the girl. Then he leaves.

Let us make the following stipulations: The gun was a plastic toy, very realistically constructed. And the girl becomes pregnant as a result of the incident.

In objective-logical statement, define the injury, if any, the *voyeur* did.

We can make the following objective-logical statements:

1. He did not have a lethal weapon.
2. He did not touch the two kids.
3. He did not wound them, or cause them any physical pain.
4. Therefore he is not in any logical-objective sense a cause of any phenomena which occurred.

True, it might have been a lethal weapon—but it was not. He might have shot them, if it had been a lethal weapon, but he didn't. If he had shot them, which he didn't, he might have caused great pain or death—but this is not-true, because it did not occur.

Clear, objective tests can demonstrate that the boy caused the girl's pregnancy; he is, therefore, solely responsible. "Might have been" factors have no bearing on a logical discussion.

Reason: Logic is incompetent to handle either the Future or the Past—and all of human reality is based on the influence of the past and present on the future. Only non-living non-purposeive entities such as electrons and atoms, can be accurately described in terms that neglect future consequences. Throw a stone at a bird, and the bird ducks; throw a stone at a stone and Newton's Laws of Motion can describe the situation. The stone has no tendency to make the future probabilities interact with present time.

If our cultural language and reasoning is so incompetent that it cannot clearly define and evaluate the problem of the *voyeur*—is it any wonder that human beings suffer inexpressible hurts and frustrations in daily living? If injury so gross can exist without ability to achieve accurate description in the only available communication channel, language—is it too strange that psychologists have problems com-

municating with their patients, and their patients with them? That friends become enemies, that nations have wars? If such gross miscarriage of justice can result from logical objective evidence as holding the boy the responsible (i.e. guilty) agent in the girl's pregnancy, is it too surprising that so many men in ordinary living feel a deep, and frustrated sense of injustice?

Nobody wants a rigor of analysis of purposive action . . . until he needs it to express something that is logically inexpressible. Then, of course, it's too late; there isn't any available.

Whether we want it or not—I'm afraid we need it.

The *voyeur* used the potential of an object which could be a lethal weapon; the lethal potential of such a weapon was ruthlessly imposed on two young people, violently disrupting the potential pattern of their lives.

But that which is-not can't be real, as everyone of course knows, and potential realities are-not, so the *voyeur* logically really did nothing, and really caused no damage, because if something is-not, it can't be damaged, can it?

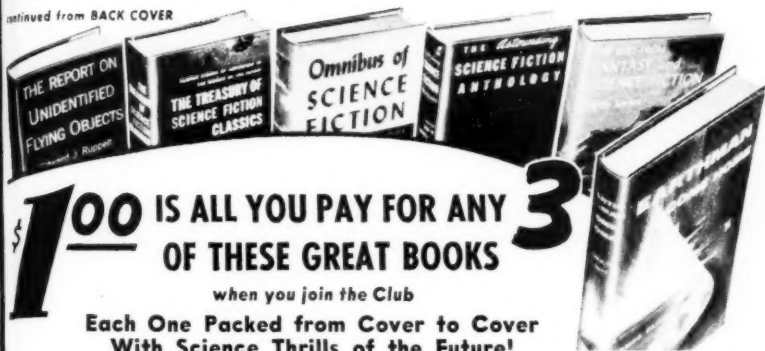
Not in logic it can't.

And that proves that the whole idea that the *voyeur* did anything is just your imagination; if there was any real problem, you could state it perfectly well in good, plain English.

THE EDITOR.

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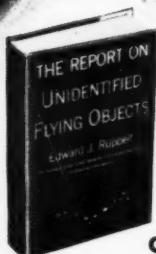
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